COMMERCIAL FERTILIZER

CONSOLIDATED WITH THE FERTILIZER GREEN BOOK

serving over 100 principal industries
through ***AA Quality*** factories and sales offices

Air view of A.A.C. plant at Detroit, Mich. . . . 30 A.A.C. factories and sales offices, most of them in or near principal industrial centers, assure dependable service.

AA Quality

for over 85 years
a symbol of quality
and reliability

principal *AA Quality* products

All grades of Florida Pebble Phosphate Rock
AA QUALITY Ground Phosphate Rock
All grades of Commercial Fertilizers
Superphosphate — Sulphuric Acid
Insecticides and Fungicides
Phosphoric Acid and Phosphate
Phosphorus and Compounds of Phosphorus
Fluosilicates — Salt Cake
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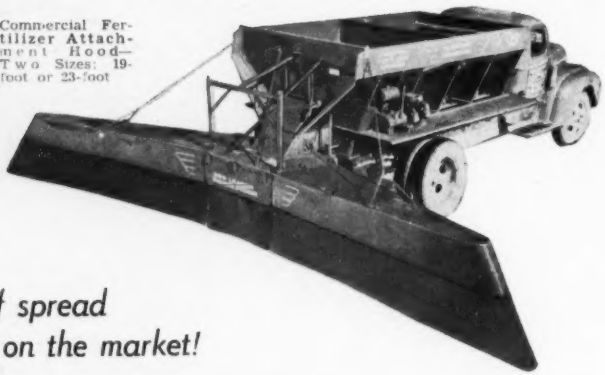
THE AMERICAN AGRICULTURAL CHEMICAL COMPANY

GENERAL OFFICE: 50 CHURCH STREET, NEW YORK 7, N. Y.

30 FACTORIES AND SALES OFFICES, SERVING U. S., CANADA AND CUBA—ASSURE DEPENDABLE SERVICE

Here's the answer to your Spreading Problems!

AGAIN! "The NEW LEADER" leads the field



Commercial Fertilizer Attachment Hood—Two Sizes: 19-foot or 23-foot

with its new "Motor-Driven Spreader" offering greater accuracy of spread with the most positive feed on the market!

SPECIAL ADVANTAGES—Uniformity of spread is not dependent on truck speed. Motor is mounted on catwalk and drives only the twin distributor discs at a constant speed, assuring full width of spread at all times together with uniform distribution.

Conveyor is separately driven from truck drive shaft by a series of V-belts to deliver the correct amount per acre—regardless of truck speed or regardless of whether the truck is driven in low super-low or any other gear.

Conveyor speed is, therefore, positively synchronized with speed of the rear wheels of truck and at each revolution of the rear wheels, the conveyor moves a given distance regardless of the truck's speed. Amount of material delivered by conveyor does not vary with hilly or soft field conditions.

Spreader Body Lengths (inside measure) are 9', 11', 13' and 15'. Other body lengths on special order.

Note: When Spreading Attachment is folded up for road-traveling position, width is approximately 7'-5"

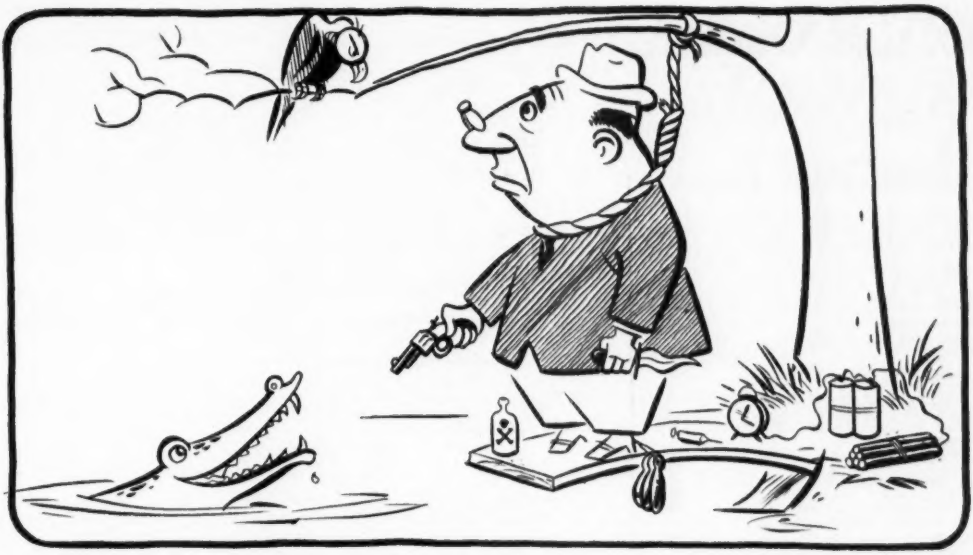
"The NEW LEADER" Self-Unloading Bulk Transport

The 20-ton capacity transport above is shown with elevator in place and ready to load a NEW LEADER Spreader truck. These units are proving very profitable; in bad weather they eliminate demurrage on railroad cars; fertilizer gets to the job quickly and spreader trucks can be kept working in the field. The transport, being a self-unloading unit, leaves the tractor truck free to return to pick up another transport load. These units have four individual compartments of 5 tons each. Each compartment may be unloaded independently of the others. Compartments and rear endgate are removable so that bagged and packaged goods may be hauled instead of bulk loads. Capacity 5 tons to 25 tons, lengths from 11 ft. to 40 ft. Written warranty with all NEW LEADER equipment. Write today for specifications, prices, etc. Fast delivery service sells fertilizer!

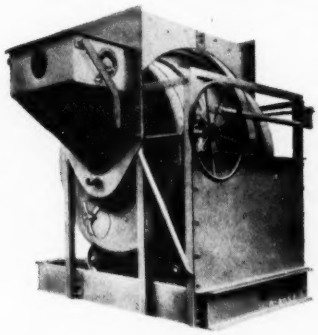
FREE! Write for "The Story of a Custom Fertilizer Spreading Service".

HIGHWAY EQUIPMENT COMPANY, INC. CEDAR RAPIDS, IOWA

MANUFACTURERS OF THE WORLD'S MOST COMPLETE LINE OF SPREADERS



He can't stand that slow mixing cycle!



WORTHINGTON DRUM-TYPE FERTILIZER MIXER, one of the complete Worthington line of industrial mixers of all kinds that incorporate features and advantages brought about during nearly a century of experience in mixer design. Standard sizes of fertilizer mixers, ½, 1, 2, 3-ton capacity.

WORTHINGTON

Industrial Mixers

Wait! Our way is easier! It's a mixer that can boost your daily output as much as 10 per cent—the *Worthington fertilizer mixer*. Secret of the fast mixing action is Worthington's engineered blade design which gives the fastest mixing cycle we know of. You save time with every batch. Mixing is thorough, too, and special mixer design is such that it eliminates these other big problems for you:

THE CORRODED DISCHARGE CHUTE—The Worthington discharge chute is out of the mixer during mixing time. Proper balance makes manual control of chute easy. Pneumatic controls also available.

THE WOBBLY DRUM ROLLER—Worthington drum rollers are of genuine carwheel metal, ground to exact diameter. Compensation for wear to permit perfect centering is accomplished by easy adjustment of drum-roller shafts.

THE HEAVY HORSEPOWER CONSUMER—Worthington's clean, anti-friction construction with specially designed parts assures minimum possible horsepower consumption.

SEND THIS COUPON TODAY to learn more about how to reduce mixing time with a Worthington fertilizer mixer.

Worthington Corporation
Industrial Mixer Division, Plainfield, New Jersey

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POSITION.....

ADDRESS.....

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COMMERCIAL FERTILIZER

ESTABLISHED 1910

June, 1952

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ADVERTISING INDEX

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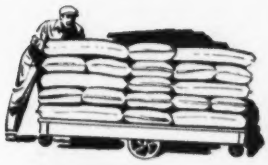
NO. 3
OF A SERIES
ON HOW TO

Stretch a MULTIWALL Paper Bag

It is just good business to get the best possible use from your multiwalls. Here are some of the ways to do it . . .

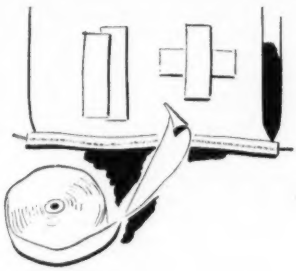


Use of Hand Trucks . . . Trucks (and chutes and conveyors) should be free of protruding nails, splinters, etc.

Two-wheel trucks should have wide, extended lips, as narrow-blade lips cut into the sacks. Wood or metal lip extensions may be added. Sacks should be piled flat. Small wooden pallets may be used if the truck lip is adequate.

On four-wheel trucks, sacks should be stacked flat and even with the truck edges, with the end sacks interlocked.

How to Lift and Carry . . . One man should pick up the sack with his hands underneath it, preferably at diagonal corners. Two men should lift the sack with the hands underneath it, supporting the four corners. Never grip or pull at the corners. Never drag the sack across the floor. Never, with a tied closure, pull at the closed end. Carry the sack with the edge resting against the body, or flat on the shoulder.



How to Repair or Overslip Damaged Bags

If seriously damaged, slip an overslip over the damaged bag (with contents intact), then close with a wire-tie or string, or roll the top down and staple it.

If the damage is minor, or an overslip is not available: **1.** Straighten paper near the tear; place torn ply or plies in original position; clean off any loose material or dirt. **2.** Apply moistened gummed tape, cut 4 or 5 inches longer than the tear. Use single, overlapping, or crossed patches, depending on size and kind of tear. **3.** If more than one ply is severely ruptured, patch each ply separately.

A 3-inch, 40-lb. or 50-lb. gummed kraft tape is satisfactory. Carry repaired sacks with the patched side up.

Want the Whole Story?

Ask your Bemis Man for free, illustrated copy of Bemis Multiwall Packaging Guide. It deals with Storage, Filling and Closing, Handling, Palletizing and other important subjects.

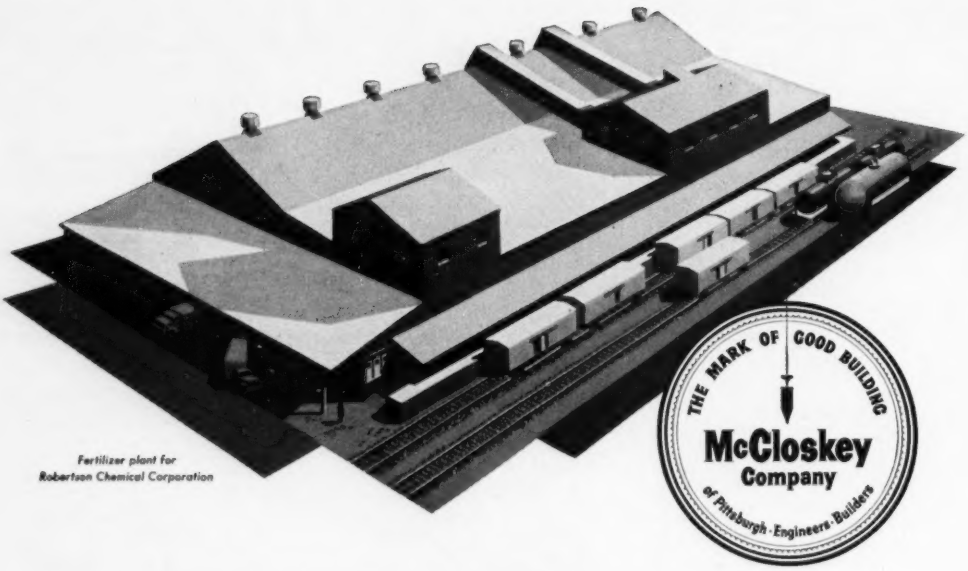
• • •

If you need cotton or ouriap bags also, Bemis is your best source.

Bemis

BEMIS BRO BAG COMPANY

St. Louis 2, Missouri



Fertilizer plant for Robertson Chemical Corporation

You Get Sound Design, Efficient Construction With McCloskey Fertilizer Plants

The design of your plant is based upon sound engineering principles when you retain McCloskey to plan and erect your new fertilizer processing unit. For, back of "The Mark of Good Building" is the experience gained in designing a number of fertilizer plants which is reflected in our modern approach to the many specialized problems involved in such an operation.

The design helps combat the destructive effects of corrosion—ample room for overhead conveyors is provided by elimination of outdated truss construction—high stacking of material is made practicable—the need for a plant of eccentric shape is provided for. All these vital elements of design are included in your plant when you retain McCloskey to plan and develop your expansion program.

The construction of your new plant gets under way fast when directed by our field engineers. They employ many cost-reducing and time-saving methods that mean your plant is ready for operation faster, your total investment is less than you would expect. You have no details to worry about, the entire project is covered by your one contract with McCloskey.

Some of the best names in the fertilizer industry use McCloskey design and construction service again and again in planning and completing their expansion programs. It will pay you, while your plans are still in the thinking stage to draw upon our experience—you will find it invaluable. Without obligation, we invite you to ask for a consultation. Write McCloskey Company of Pittsburgh, 3412 Liberty Ave., Pittsburgh 1, Pennsylvania.

McCloskey Company

of Pittsburgh

Engineers - Builders

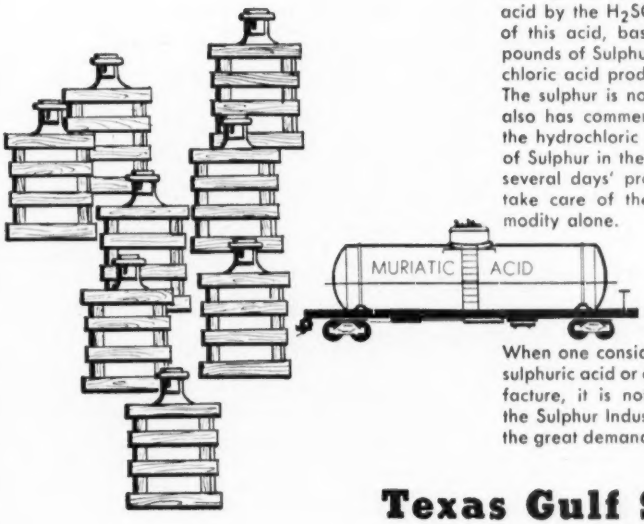
Sulphur

Loading a ship with Sulphur at Galveston

Thousands of tons mined daily, but where does it all go?

PARAPHRASING an old saying: 'It takes a chemical to make a chemical,' certainly applies to hydrochloric acid.

No chemical engineer has to be told how hydrochloric acid is made but sometimes with the mind focussed on the word "hydrochloric" little thought is given to another word "sulphuric." It is this word that calls attention to the fact that to make one net ton of 20° Bé hydrochloric acid by the H_2SO_4 process requires about 950 pounds of this acid, basis 100%, which is equivalent to 320 pounds of Sulphur. About one third of the annual hydrochloric acid production is made by the use of sulphuric. The sulphur is not lost because salt cake, a by-product, also has commercial value. But any way you figure it, the hydrochloric acid industry is an important consumer of Sulphur in the form of sulphuric acid. In fact, it takes several days' production from all the Sulphur mines to take care of the annual production of this one commodity alone.



When one considers all the other chemicals that require sulphuric acid or other Sulphur compounds for their manufacture, it is not difficult to appreciate how faithfully the Sulphur Industry is serving industry today in spite of the great demands made upon it.

Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N. Y.

Mines: Newgulf and Moss Bluff, Texas

JUST AROUND THE CORNER

By Vernon Mount

THE WORLD AWAITS NOVEMBER and America's decision on which party, which man is going to run the US for the next presidential term. The federation of Europe, which actually might develop into the much-discussed United States of Europe some day, won't be ratified until after our election. The chances are no overt acts will take place in the periphery of USSR during that time. Things will remain pretty much status quo, even though Russian-induced excitements, alarums and excursions may make it look otherwise.

WE ARE KEY TO WORLD AFFAIRS these days. Our thinking dominates international planning everywhere. Because we are the one free nation that can produce the materiel of a war, and man it too.

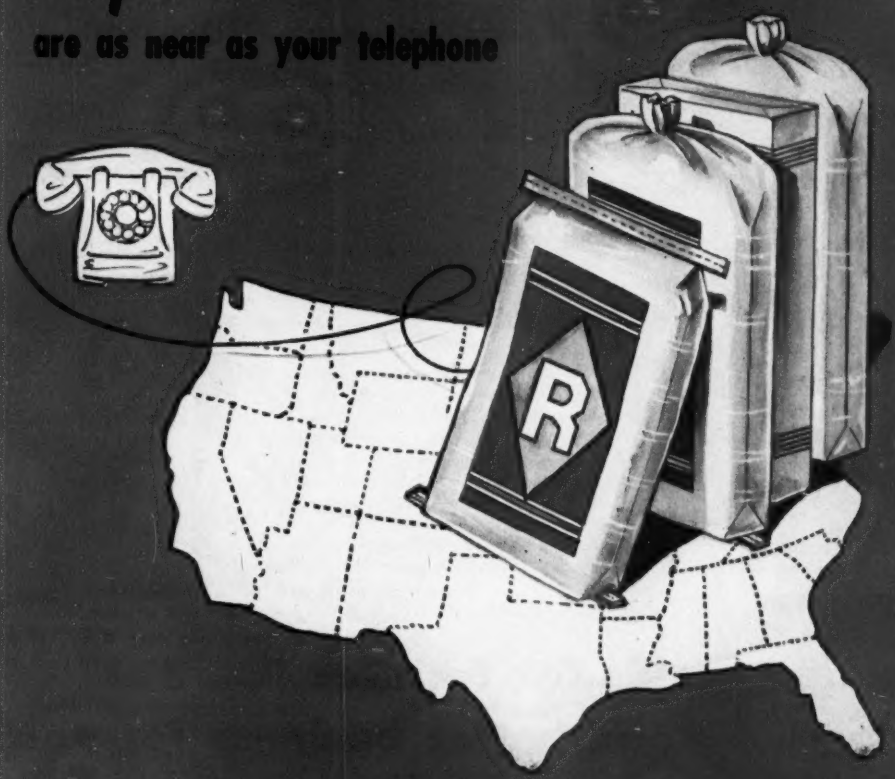
KEEP THIS IN MIND as you make your decision and vote next November. I mention it now because it is going to take sound judgement to sort out the candidates from this vital viewpoint. Saving our own democracy is vital. Getting taxes down and job-opportunities up is necessary. Keeping our people from falling into inter-racial and economic hatreds is urgent. But the key to whether we preserve such freedom as is left throughout the world is paramount--because we could never stand alone, as the one democratic nation, in a world otherwise totally enslaved.

Yours faithfully,

Vernon Mount

Raymond MULTI-WALL PAPER SHIPPING SACKS

are as near as your telephone



North, south, east, or west, wherever good commercial fertilizers are used, packed, or shipped, you'll find these strong, dependable Shipping Sacks on the job.

They are CUSTOM BUILT to specifications. Made in various sizes, types, and strengths, they are available printed or plain. Let Raymond fill your packing and shipping needs. A Raymond representative will be glad to assist you in selecting the perfect container for your products. Wire, write, or phone today.

THE RAYMOND BAG COMPANY . . Middletown, Ohio

RAYMOND

Multi-Wall PAPER SHIPPING SACKS

CLARENCE CHASE

Fertilizing pastures with 10-10-10 produced an extra $90 worth of dairy feed per acre for Gale and Clarence Chase,

SUN PRAIRIE, WIS.

THE CHASE BROTHERS of Sun Prairie, Wisconsin were among farmers who cooperated in the pasture improvement program sponsored by the University of Wisconsin under the Direction of C. J. Chapman, Professor of Soils. Here's their report:

"We fertilized part of our pasture last spring with 10-10-10 at about 500 pounds per acre. The growth of grass was so rank we could have cut a hay crop by the middle of June.

"In a demonstration set up on our pasture by the county agricultural agent, yields were taken. The unfertilized area made 2531 pounds of dry material per acre, and the fertilized made 5737 pounds per acre, an increase of 2905 pounds. This extra feed was the equivalent of 16-18% dairy feed which, at $60 a ton, would be worth about $90."

GALE CHASE

Bigger yields for farmers mean better business for you

● High-nitrogen mixed fertilizers have proved again and again that they pay their own way and give the user a nice profit to spare. As farmers learn more about their benefits, demand goes up and up.

To give your customers the most effective high-nitrogen fertilizers, use U·S·S Ammonium Sulphate for a major part of the nitrogen content. It's a dry, free-running material that stands up well in storage and performs well in distributing equipment. Its all-ammonia nitrogen won't leach, yet becomes readily available during the growing season.

Promotion efforts you put behind high-nitrogen fertilizers containing U·S·S Ammonium Sulphate will yield big returns. You and your dealers can recommend it for pastures, corn, wheat and other small grain. The spring fertilizer season is at its height; get your share of this business. United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pa.

U·S·S AMMONIUM SULPHATE

USS

UNITED STATES STEEL

Wherever you spread... whatever you spread Baughman bodies do the job better with more profit for you!

The Only COMPLETE LINE

- ALLOY STEEL CONSTRUCTION GIVES MAXIMUM PAYLOAD.
- 13 basic agricultural models, each built to do a better spreading job of materials for which designed.
- Lengths from 9 to 33 ft. (5 to 30 tons capacity) . . . 1 to 6 compartments for selective unloading of different materials.
- Available with single or double spreading distributor.
- Four different gear reductions and drag chain flight spacing . . . this controls volume from a few hundred lbs. to 3 or more tons per acre.
- Complete selection of conveyor bottom widths.
- Controlled volume and spread pattern at any truck speed. Oil-sealed clutch and 3-speed transmission regulate rate of discharge from body . . . velocity of spinner remains in constant ratio to engine speed because of direct drive.

ASK-3-8

ASK-3W-6

FERTILIZER SPRAYER holds the spread to the ground and makes it stick. Covers up to 4 acres to the mile at 15 miles per hour.

ROCK PHOSPHATE SPREADER ATTACHMENT gives uniform spreads on the level, slopes and hillsides. Designed to prevent materials from packing and crusting.

ASK-MS-4

- WRITE FOR FULL INFORMATION AND OUR RECOMMENDATIONS

BAUGHMAN
HI-SPEED SPREADING AND CONVEYING EQUIPMENT

BAUGHMAN MANUFACTURING CO., Inc.
961 SHIPMAN ROAD
JERSEYVILLE, ILLINOIS

"The Pioneers of the Fertilizer Spreading Industry"

We supply manufacturers of fertilizers with raw materials from every corner of the earth. If you have a supply problem, write, wire or phone us today.

H. J. BAKER & BRO.

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600 FIFTH AVENUE, NEW YORK 20, N. Y.

Branch Offices: Baltimore • Chicago • Savannah • Tampa

Laborer... 1952 MODEL

No matter how good a man may be with a hand shovel and wheelbarrow, his production is many times greater as a "PAYLOADER" pilot. What's more — both he and his boss are happier because they both make more money.

In hundreds of fertilizer and chemical plants "PAYLOADERS" have taken over unpleasant, laborious material-moving chores — saving time, cutting costs and increasing production. They scoop up, carry, dump, spread and stockpile all kinds of materials such as fertilizer, chemicals, coal, coke and ashes . . . lift, push . . . spot and unload box cars and do many other cost-cutting jobs . . . release manpower for more productive work.

Every "PAYLOADER" is a complete Hough-built tractor-shovel designed specifically for tractor-shovel work, with multiple reverse speeds, large pneumatic tires and other features that insure fast, low-cost performance over floors or unpaved ground, up and down ramps, through congested areas. The "PAYLOADER" is sold by a world-wide Distributor organization with complete service facilities and seven sizes are available from 12 cu. ft. to 1½ cu. yd. bucket capacity. The Frank G. Hough Co., 702 Sunnyside Ave., Libertyville, Illinois.

JOB STUDIES are available without cost or obligation. Each one is a detailed, authorized word-and-picture report of "PAYLOADER" performance in a specific plant. A request on your letterhead is all that's necessary.

SAY "HUFF"

PAYLOADER®

THE FRANK G. HOUGH CO. • Since 1920

Producing Nitrogen At Full Capacity!

Phillips is producing nitrogen fertilizer materials at full capacity. But even our tremendous rate of production isn't always sufficient to meet today's demand. We'll do our best for you. Keep us in mind if you need nitrogen in any form.

AMMONIUM SULFATE—Phillips *66* Ammonium Sulfate is a free-flowing 21% nitrogen material! Mixes easily! Uniform crystals resist caking! Ideal for high-analysis mixed goods! A fine direct application material!

AMMONIUM NITRATE—Phillips *66* Prilled Ammonium Nitrate contains 33% nitrogen. The small, coated prills or pellets resist caking . . . handle easily. Phillips *66* Prilled Ammonium Nitrate can be depended on for uniform, free-flowing properties and top-notch crop response.

NITROGEN SOLUTIONS—More N per dollar! Phillips *66* Nitrogen Solutions are well suited to the preparation of high-analysis fertilizers and the ammoniation of superphosphate. These three nitrogen solutions keep handling costs low . . . promote rapid, thorough curing!

ANHYDROUS AMMONIA—Tank car shipments of Anhydrous Ammonia (82% nitrogen) go out to Phillips contract customers from Phillips production facilities in the Texas Panhandle. Write our nearest district office for full information.

Phillips 66

PHILLIPS CHEMICAL COMPANY

A Subsidiary of Phillips Petroleum Company

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OMAHA—WOW Bldg. • AMARILLO—First National Bank Bldg. • LOS ANGELES—4521 Produce Plaza West • BARTLESVILLE—Adams Building

DELANEY REPORT IN

Congressman James J. Delaney (D.,N.Y.), Chairman of the Select Committee to Investigate the Use of Chemicals in Food, has submitted to the House the first section of a four or five-part report on the work of the Select Committee.

Titled "Fertilizers", the report announces the committee's "considered judgment that the situation existing in the field of fertilizers does not reveal any need at this time for Federal legislation."

Created by the 81st Congress in June, 1950, the Select Committee on Chemicals in Food held hearings in September, November, and December of 1950, and recommended to the House that its investigation be continued. Authority to do so was granted by the 82nd Congress, and further hearings were held during 1951 and 1952.

Four volumes of hearings have been published, covering sessions in New York, Chicago, San Francisco, Los Angeles, and Seattle, in addition to those held in Washington, D. C.

The committee declared it found "no reliable evidence was presented to indicate that the use of chemical fertilizer presents a hazard to man or animals."

The committee stressed the importance, however, of the use of organic fertilizers, such as farm manures, crop residues and legumes. "It is the committee's opinion," the report ran, "that more extensive research should be conducted to seek practical methods of conserving and utilizing various wastes and other organic matter for fertilizing purposes. It is the committee's view, also, that long term studies to determine (1) the relative effect of chemical and organic fertilizers upon the nutritive value of crops, and (2) the relationship of soils to human nutrition and health, should be strongly encouraged."

Chairman Delaney said the Select Committee had decided upon the plan of submitting four or five reports in place of one large one because of the several major topics covered in the investigation. The committee was empowered to investigate the use of chemicals in food products, pesticides, and fertilizers. A further field of investigation was added when Congress authorized the committee to study the use of chemicals in cosmetics. This extension of power was granted last September.

It Seems to Me

by BRUCE MORAN

Out in Nebraska a fertilizer dealer is being accused by OPS of overcharging farmers in 231 fertilizer sales. OPS officials contend the sales should have been made at the wholesale rate, whereas the dealer made them at retail prices.

Attorneys for the dealer contend that the farmer is the ultimate consumer, that the dealer is a retailer—and that the price should be at the retail level.

The OPS district counsel says farming is a commercial operation, and therefore, under the regulations, a wholesale customer. He agrees the farmer is the ultimate consumer, but says this is not the test. The real test, he insists, is whether or not the farmer is engaged in business, and as a business man is entitled to the wholesale rate.

I make no pretense of legal knowledge, but it seems to me that the real definition of a wholesale sale is one which is made for re-sale of the product. The farmer does not pay a wholesale price for his tractor. Yet this, just as much as the fertilizer, is an instrument in growing the crop he finally does sell.

The case is worth watching. It could affect our industry widely, as well as the farm machinery and other fields.

INDUSTRY CALENDAR

Date	Organization	Hotel	City
June 16-18	NFA	Greenbrier	White Sulphur
June 19-22	APFC	Homestead	Hot Springs
June 23-27	Canadian	Seigniory Club	Montecello
Aug 17-23	Grasslands	Penn State	State College
Nov. 10-12	CFA	Desert Inn	Palm Springs

LARGEST IN HISTORY

Commercial Fertilizers
CONSUMPTION IN THE UNITED STATES
1950-1951

By WALTER SCHOLL & H. M. WALLACE
Division of Fertilizer and Agricultural Lime
Bureau of Plant Industry, Soils and Agricultural Engineering
Agricultural Research Administration
U. S. Department of Agriculture
Beltsville, Maryland

The total consumption of commercial fertilizers in the year ended June 30, 1951, amounted to 20,988,740 tons, containing 1,238,234 tons of nitrogen, 2,110,127 tons of available phosphoric oxide (total P_2O_5, 2,537,162 tons), and 1,379,794 tons of potash. This is the largest consumption ever recorded. It represents an increase of 2,645,440 tons of fertilizers or 14 percent more than the consumption of 18,343,300 tons reported in 1949-50 (1). Mixed fertilizers, 13,977,850 tons, constituted 66.6 percent of this total. The other 33.4 percent, used mainly for direct application, was composed of superphosphate, 1,773,279; phosphate rock and colloidal phosphate, 1,039,624; sodium nitrate, 683,800; ammonium nitrate, 638,176; and gypsum, 606,897 tons, with lesser quantities of more than 60 other materials. The weighted average nutrient content of commercial mixtures used in 1950-51 was 24.19 percent as compared with 23.24 percent in 1949-50.

The data herewith show the number of tons of fertilizer reported shipped by manufacturers for consumption in agriculture throughout the forty-eight States and the Territories. The amount of nutrients (N, P_2O_5, K_2O) contained in these commercial fertilizers was computed from the tonnages determined in this survey and analyses published by State Control Officials. The weighted average nutrient content of commercial mixtures was determined from the grades and tonnages reported for each State and the average overrun or underrun. Fertilizer manufacturers, State fertilizer control officials, and agronomists cooperated freely in providing information for this 12th annual survey.

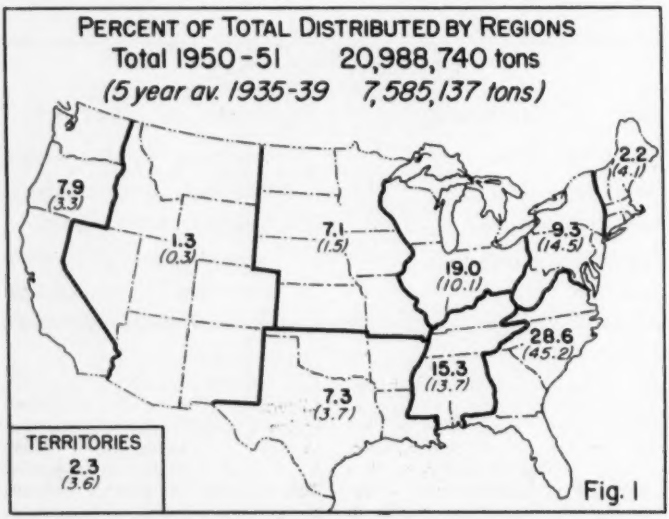

Fig. 1

Tonnage, By States

Consumption of all fertilizers, by States, regions and classes, is given in Table 1. Although the United States as a whole used more fertilizer in 1950-51 than in 1949-50, a number of States used less; for example, the New England States, excepting Massachusetts and Vermont. The largest decrease (48,469 tons) for any State was in Maine. Consumption in Maine, therefore, was about the same as in 1940. Consumption increases of 100,000 tons or more were recorded in 10 States. The largest increases were 412,274 tons in California, 306,352 in Illinois, and 229,619 in Missouri. Six states, Alabama, California, Florida, Georgia, Illinois, and North Carolina used more than a million tons each. In 12 other States, more than one-half million tons was recorded. The distribution, by regions, is shown in Figure 1, as the percentage of the total consumed in 1950-51. For comparison, the average percentages in Agricultural Statistics for the years 1935 to 1939 are also shown (2).

Mixtures

The 13,977,850 tons of mixed fer-

tilizers consumed in the Continental U. S. and Territories in the year ended June 30, 1951, comprised 66.6 percent of the total fertilizers consumption, as compared with 67.0 percent (12,297,596 tons) in 1949-50. In the Continental U. S., there were 903 grades listed by their guaranteed analysis. Eighty-nine of these comprised 95.3 percent of the total quantity consumed. These 89 grades are listed in Table 2, with the quantities consumed in 1950-51 and 1949-50.

The 3-12-12 grade, leading all other grades in amount consumed (1,841,928 tons), comprised 13.5 percent of the total quantity of mixtures in the Continental U. S. Consumption of this grade in 1949-50 was 1,221,725 tons. Distribution is principally in the North Central region. The 5-10-5, 3-9-6, 3-12-6, and 4-10-6 grades were sold in next largest quantities in the order named. The total of these five grades was 4,943,153 tons or 36.2 percent of the total for all mixtures in the Continental U. S. in 1950-51. The 2-12-6 grade, which was the leading grade from 1941 to 1949 and second highest in 1949-50, dropped to sixth place.

The 15 principal grades distributed in each Region during the current fertilizer year are listed in Table 3, with their consumption in each of the respective States of the region. For most of the States, these 15 grades represent 80 percent or more of the total consumption in the State. A number of exceptions occur, however, particularly, in the West North Central, Mountain, and Pacific regions. Nevertheless, with the exception of Florida and Nevada, these grades represent more than 50 percent of the total consumption in the State.

The same 15 grades comprise the list as in 1949-50, except for one or two changes in each region. The 10-10-10 grade, for example, appears on the list for New England instead of the 4-12-4. The listing in order of consumption, however, is somewhat different. Grades moving up in the list were generally those with a higher analysis.

Of the mixed fertilizers sold in 1950-51, 12,521,867 tons or 89.6 percent were N-P-K mixtures. As may be seen from Table 6, the next most important group was the P-K mixtures which comprised 1,091,392 tons or 7.8 percent of all commercial mixtures: with the N-P-K mixtures they constitute 97.4 percent of the total. N-P mixtures and N-K mixtures, in this order, sold in the next largest tonnage. The order of consumption of these four classes remained the same as in 1949-50.

The weighted average nutrient content of commercial mixtures consumed in the United States increased from 23.24 percent in 1949-50 to 24.19 percent in 1950-51 (Table 4). This average, in 1950-51, comprised, nitrogen 4.18, available P_2O_5 11.03, and K_2O 8.98 percent. The value of

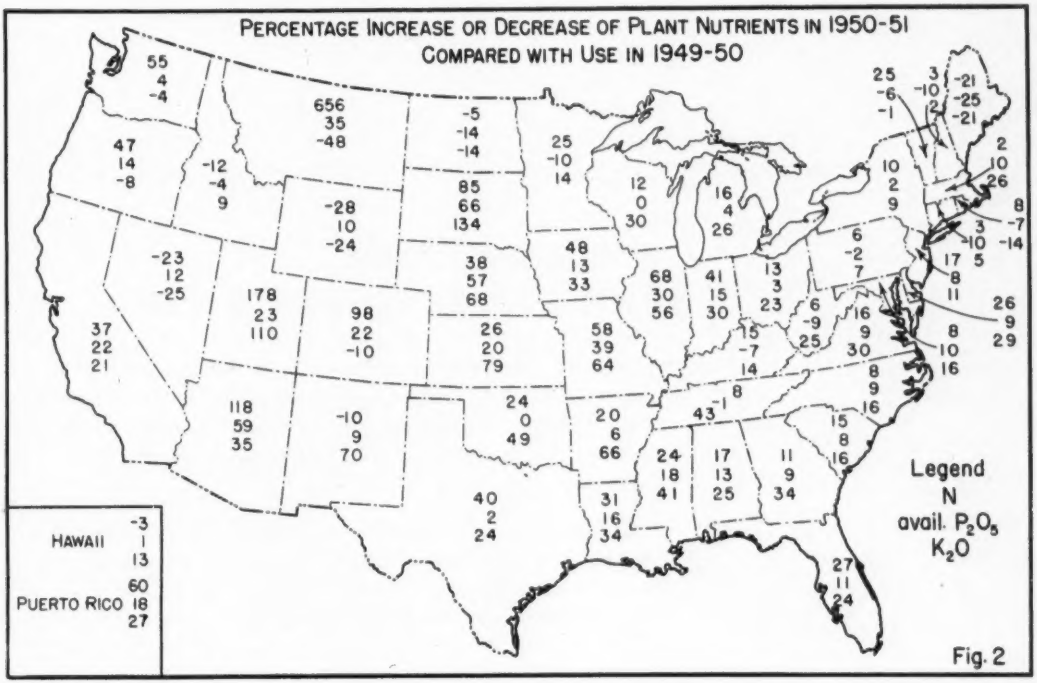

Fig. 2

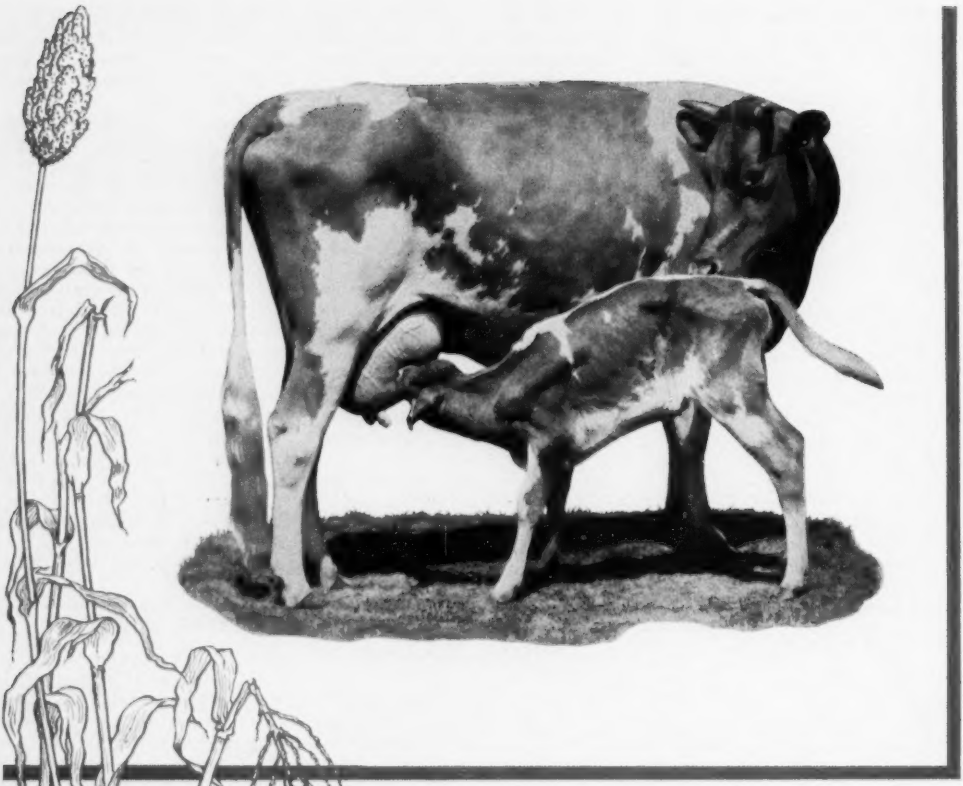

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TABLE 1

Consumption of Commercial Fertilizer Mixtures and Separate Materials

Year Ended June 30, 1951 1/

State & Region	Commercial Mixtures			Separate Materials			All Fertilizers	Relative Consumption 1949-50 = 100	
	July 1 - Dec. 31, 1950	Jan. 1 - June 30, 1951	1950-51 Year Total	July 1 - Dec. 31, 1950	Jan. 1 - June 30, 1951	1950-51 Year Total	1950-51 Grand Total	All Fertilizers 2/	Total N, Avail. P_2O_5, & K_2O
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Percent	Percent
Maine	15,827	137,106	152,933	5,015	7,000	12,015	164,948	77	78
New Hampshire	2,843	14,162	17,005	3,214	6,231	9,445	26,450	94	95
Vermont	5,945	26,473	32,418	9,104	21,508	30,612	63,030	100	98
Massachusetts	10,394	63,060	73,454	6,293	15,803	22,096	95,550	107	113
Rhode Island	1,547	12,658	14,206	577	2,954	3,531	17,736	99	93
Connecticut	5,538	49,705	55,243	9,316	24,395	33,710	88,953	94	98
New England	42,094	303,164	345,258	33,518	77,891	111,409	456,667	90	90
New York	83,911	358,680	442,591	84,454	129,854	184,308	626,899	103	105
New Jersey	47,125	185,483	232,608	8,176	16,895	25,071	257,679	109	111
Pennsylvania	147,375	371,423	518,798	33,845	72,740	106,585	625,383	99	102
Delaware	15,029	49,162	64,191	851	2,227	3,078	67,269	117	119
District of Columbia	244	1,230	1,474	287	432	719	2,193	113	98
Maryland	74,367	169,809	244,166	12,984	18,656	31,620	275,786	110	111
West Virginia	11,361	81,892	63,253	9,417	28,404	37,821	101,074	97	99
Middle Atlantic	379,402	1,167,679	1,547,081	119,964	269,238	389,202	1,956,283	103	106
Virginia	176,369	600,423	676,782	44,672	108,943	164,615	831,397	113	116
North Carolina	304,991	1,226,733	1,531,724	99,289	268,213	367,502	1,899,226	109	111
South Carolina	131,627	547,547	679,174	76,214	204,099	280,313	959,487	110	112
Georgia	146,469	889,590	1,036,089	85,033	190,862	275,895	1,311,954	111	117
Florida	345,740	571,632	917,272	35,113	49,977	85,090	1,002,362	114	120
South Atlantic	1,105,186	3,736,925	4,841,011	340,321	823,094	1,163,415	6,004,426	111	114
Ohio	316,661	568,796	885,457	26,060	40,011	66,071	951,728	106	112
Indiana	250,810	569,338	820,148	50,470	64,031	114,501	934,649	117	124
Illinois	184,705	313,168	497,873	415,290	323,745	739,035	1,176,908	135	145
Michigan	156,068	301,421	457,479	16,763	31,407	48,160	505,639	107	113
Wisconsin	74,920	291,628	366,548	16,089	27,318	43,887	410,435	107	114
East North Central	923,384	2,044,351	2,967,705	824,642	487,012	1,011,654	3,979,359	116	121
Minnesota	31,913	120,470	152,383	16,876	31,728	48,604	200,987	92	99
Iowa	42,401	199,987	242,388	42,803	101,189	143,692	386,080	116	122
Missouri	119,915	267,068	386,983	101,156	149,190	250,346	637,329	156	149
North Dakota	1,564	8,662	10,226	1,147	2,832	3,979	14,205	76	87
South Dakota	730	3,470	4,200	1,368	3,152	4,520	8,720	160	172
Nebraska	3,285	14,630	17,913	14,087	35,857	49,944	67,857	155	145
Kansas	36,092	34,472	70,564	71,676	43,410	115,086	185,650	116	123
West North Central	235,898	648,729	884,627	249,813	367,358	616,171	1,500,798	127	125
Kentucky	65,226	349,365	414,591	59,636	85,988	145,624	560,215	101	102
Tennessee	84,787	324,282	389,069	74,149	85,087	159,236	548,305	108	112
Alabama	137,423	491,646	629,069	208,736	270,256	478,991	1,308,060	114	117
Mississippi	33,188	297,147	330,335	243,021	219,378	462,399	792,734	124	117
East South Central	300,624	1,462,440	1,963,064	582,542	660,708	1,243,250	3,206,314	113	113
Arkansas	23,186	190,610	213,796	51,813	117,685	169,498	383,264	120	126
Louisiana	26,681	148,809	174,460	56,187	98,140	150,327	324,787	118	126
Oklahoma	15,323	51,195	66,518	40,629	39,051	79,680	146,198	103	109
Texas	65,013	217,141	282,154	196,862	130,593	327,455	609,609	110	113
West South Central	129,143	607,755	736,898	344,491	382,469	726,960	1,463,858	114	119
Montana	431	1,834	2,265	6,356	12,222	18,580	20,845	191	173
Idaho	413	7,015	7,428	11,736	28,127	39,863	47,291	94	94
Wyoming	128	625	753	1,475	4,076	5,551	6,304	111	104
Colorado	3,392	15,582	18,974	10,325	21,482	31,807	50,781	130	138
New Mexico	201	1,694	1,895	8,866	13,968	19,834	21,749	111	108
Arizona	5,666	22,094	27,662	31,239	45,279	76,518	104,180	190	193
Utah	212	2,118	2,330	14,083	12,200	26,283	28,613	181	176
Nevada	54	187	241	362	512	874	1,115	107	106
Mountain	10,799	51,149	61,948	81,444	137,886	219,330	280,878	143	143
Washington	4,915	24,317	29,232	23,688	33,327	57,015	86,247	105	121
Oregon	4,876	19,299	24,175	31,383	46,987	100,340	124,515	132	125
California	80,685	139,122	219,807	518,904	709,864	1,228,768	1,448,575	130	131
Pacific	90,476	182,738	273,214	893,945	792,178	1,386,113	1,659,337	128	129
Continental U. S.	3,216,576	10,423,830	13,640,406	2,969,680	3,997,834	6,967,514	20,607,920	113	116
Hawaii	25,438	28,174	53,612	27,016	38,827	72,843	126,455	110	102
Puerto Rico	142,418	141,307	283,725	33,886	36,838	70,124	353,849	141	140
Alaska	0	107	107	0	409	409	516	-	-
Territories	167,856	169,588	337,444	70,902	72,774	143,376	480,820	131	126
Total U. S., 1950-51	3,384,432	10,593,418	13,977,850	2,940,582	4,070,608	7,010,890	20,988,740 3/	114	116
1949-50 3/	2,648,560	9,649,036	12,297,596	2,261,020	3,734,684	5,048,704	18,343,300 3/	100	100
1948-49	3,214,721	9,622,785	12,839,506	2,307,273	3,398,106	5,702,379	18,541,885 4/	101	97

1/ Includes: ground phosphate rock, basic slag, minor element materials, such as borax, sulfur, manganese sulfate, etc. Used as separate materials, also fertilizers distributed by Government agencies. Does not include liming materials, but includes gypsum.

2/ Materials not guaranteed to contain N, P_2O_5 or K_2O excluded from these calculations.

3/ Revised.

4/ Includes 645,441 tons of minor and secondary element materials, principally gypsum, not guaranteed to contain N, P_2O_5 or K_2O.

5/ Includes 439,807 tons " " " " " " " " " " " " " " " " " "

6/ Includes 609,865 tons " " " " " " " " " " " " " " " " " "

TABLE 2

Consumption of Mixed Fertilizers in the Continental United States, Year Ended June 30, 1951 by Principal Grades, with Comparison for Year Ended June 30, 1950

Grade	Consumption Year Ended June 30,		Proportion of Total Year Ended June 30,		Grade	Consumption Year Ended June 30,		Proportion of Total Year Ended June 30,	
	1951	1950	1951	1950		1951	1950	1951	1950
	Tons	Tons	Percent	Percent		Tons	Tons	Percent	Percent
0-9-27	49,928	35,061	.37	.29	6-20-20	28,778	9,181	.21	.08
0-10-20	26,014	19,956	.19	.16	6-3-6	25,179	25,273	.17	.21
0-10-30	18,507	5,991	.14	.05	6-4-4	13,710	5,635	.10	.05
0-12-12	144,349	130,485	1.06	1.08	6-6-6	34,837	27,106	.26	.23
0-12-20	22,690	7,460	.17	.06	6-6-8	16,759	13,763	.12	.11
0-14-7	142,809	132,808	1.04	1.10	6-6-9	29,080	16,286	.21	.14
0-14-10	115,829	119,836	.85	1.00	6-8-4	260,783	287,406	1.91	2.39
0-14-14	234,776	118,720[1]	1.72	.99	6-8-6	263,851	287,063	1.93	2.38
0-20-10	60,331	85,799	.44	.71	6-8-8	218,334	168,758	1.60	1.40
0-20-20	217,182	116,880	1.59	.97	6-8-12	84,544	38,154	.40	.32
2-12-6	588,484	879,784	4.31	7.31	6-9-6	10,261	9,892	.08	.08
2-12-12	321,012	198,766	2.35	1.65	6-9-12	41,993	59,412	.31	.49
2-14-8	14,874	16,240	.11	.13	6-10-6	53,975	53,004	.40	.44
2-16-8	28,764	34,610	.21	.29	6-12-6	41,443	25,982	.30	.22
3-6-5	20,044	24,546	.15	.20	6-12-12	80,257	30,806	.59	.26
3-8-8	26,873	25,469	.20	.21	6-18-6	12,494	11,880	.09	.10
3-9-6	856,177	781,651	6.28	6.49	6-24-0	16,220	6,734	.12	.06
3-9-9	349,478	276,011	2.56	2.28	6-24-12	12,837	7,633	.09	.06
3-9-12	32,721	29,132	.24	.24	7-7-7	35,705	50,892	.26	.42
3-9-18	203,851	128,934	1.49	1.07	8-0-8	17,332	12,928	.13	.11
3-9-27	23,229	5,633	.17	.05	8-8-4	21,371	19,646	.16	.16
3-12-6	728,914	803,325	5.34	6.67	8-8-8	146,855	89,392	1.08	.74
3-12-12	1,841,928	1,221,725	13.50	10.15	8-10-12	13,066	10,085	.10	.08
3-18-9	119,013	154,636	.87	1.28	8-12-16	20,534	29,484	.16	.24
4-6-6	15,984	12,210	.12	.10	8-16-16	38,575	38,432	.28	.32
4-8-8	86,714	82,103	.63	.68	8-24-8	37,859	12,880	.28	.11
4-7-5	118,886	118,348	.87	.98	8-32-0	26,889	11,617	.20	.10
4-8-4	14,022	16,016	.10	.13	10-0-10	30,094	18,468	.22	.15
4-8-8	584,607	559,931	4.29	4.65	10-8-4	28,249	26,324	.21	.22
4-8-8	264,408	221,489	1.94	1.84	10-10-0	24,025	18,841	.18	.15
4-8-12	85,850	72,036	.61	.60	10-10-5	42,521	38,067	.31	.32
4-9-3	85,010	81,701	.61	.68	10-10-10	71,696	32,071	.53	.27
4-10-6	618,461	623,372	4.53	5.17	10-16-8	12,861	10,194	.09	.08
4-10-7	455,510	386,671	3.41	3.21	10-20-0	60,377	33,714	.44	.28
4-12-4	384,131	432,923	2.87	3.60	10-20-10	11,909	6,890	.09	.06
4-12-8	12,809	15,064	.09	.13	12-0-10	14,624	8,011	.11	.07
4-12-8	243,396	276,994	1.78	2.30	12-12-12	15,827	4,338	.11	.04
4-12-12	33,067	20,614	.24	.17	12-24-12	11,826	1,036	.09	.01
4-16-0	51,186	63,999	.38	.45	14-0-14	19,400	11,446	.14	.10
4-16-8	48,828	46,617	.34	.38	16-8-4	11,706	7,303	.09	.06
4-16-16	121,899	44,080	.89	.37	17-7-0	31,700	21,633	.23	.18
4-24-12	65,092	62,283	.48	.52	89 mixtures	12,999,638	11,473,038	95.30	95.32
5-5-20	22,554	17,693	.17	.15	Other specified grades[2]	554,184	498,438	4.06	4.14
5-7-5	20,166	19,889	.15	.17	Not segregated	86,714	64,560	.64	.54
5-8-7	26,531	31,031	.19	.26					
5-10-5	897,673	872,377	6.58	7.25	Total	13,640,406	12,036,038[1]	100.00	100.00
5-10-10	588,839	446,741	4.29	3.71					
5-20-10	29,611	17,823	.22	.15					

1/ Revised.

2/ There were 903 in 1950-51 and 638 in the 1949-50 season.

these nutrients respectively are 0.16, 0.10, and 0.69 higher than in 1949-50. Although the average nutrient content of mixtures selling in most of the States increased, there are exceptions, for example, Arizona, Oklahoma, New Mexico, and the New England States except Massachusetts and Connecticut.

The average nutrient contents, especially potash, have increased remarkably since 1935-39. The five year average nutrient contents of mixtures for 1935-39, as given in Agricultural Statistics (3), have changed in 1950-51 as follows: nitrogen 3.65 to 4.18, available P_2O_5 9.36 to 11.03, and K_2O 5.88 to 8.98 percent. The percentage increase of these nutrients was 14.5, 17.8, and 52.7, respectively. The average nutrient ratio changed from 1—2.56—1.61 in 1935-39 to 1—2.64—2.15 in 1950-51.

Materials

In addition to mixed fertilizers, agriculture also used in 1950-51 7,010,890 tons of materials for direct application to the soil or for farm mixing. This is 965,186 tons more than used in 1949-50. The quantities of the various materials used are given in Tables 5 and 6.

The classes of materials consumed are in order of tonnage, phosphates, 3,490,350 tons (49.8 percent); chemical nitrogen materials, 2,304,500 tons (32.9 percent); minor and secondary element materials, 645,441 tons (9.2 percent); organics, 318,879 tons (4.5 percent); and potash materials, 251,720 (3.6 percent).

Net increases in consumption over 1949-50 were as follows: chemical nitrogen materials 518,596, minor and secondary element materials 205,934, phosphates 132,139, potash materials 82,821, and organics 25,696 tons. Chemical nitrogen materials showing the highest proportional increases were calcium nitrate, ammonium sulfate, and ammonium nitrate-limestone mixtures. The principal source of calcium nitrate

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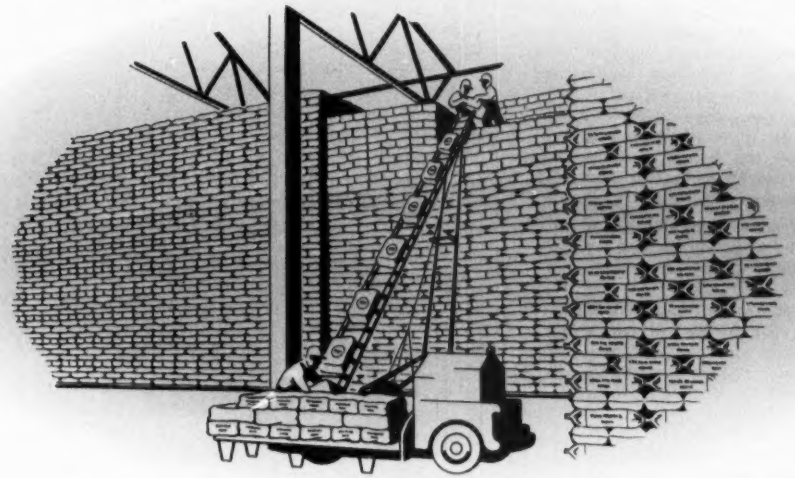

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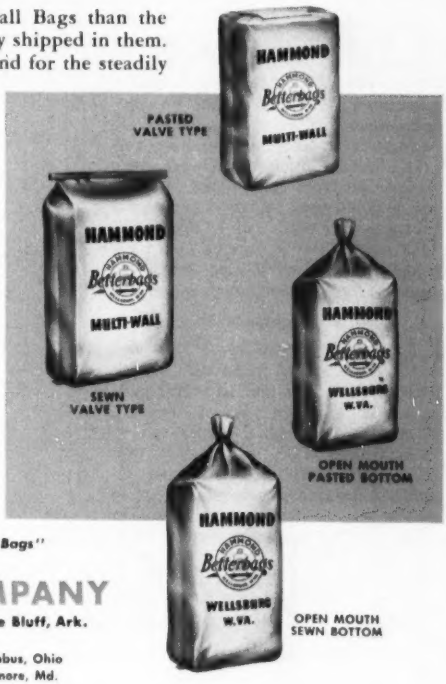

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was Norway: imports from June, 1950 to May, 1951 were 44,402 tons. Its use in California, as well as in a number of other States, appears to be growing. Consumption of ammonium sulfate and ammonium nitrate-limestone mixtures more than doubled in a number of States. Greater interest was shown in anhydrous ammonia for direct application. Its use was recorded in 23 States. This is four more than in 1949-50 and 13 more than in 1948-49. The large consumption of gypsum in California was the reason for the higher total use of the minor and secondary element materials.

The use of ammonium phosphate (16-20) increased in States west of the Mississippi, where this material is more generally consumed. The principal consumption of phosphate rock was in Illinois and Missouri. These two States consumed 74.2 percent of the total in 1950-51 and 70.5 percent in 1949-50. Most of the increase in use of basic slag was in Alabama. Distribution of superphosphate for direct application decreased 348,653 tons (16.4 percent) compared with 1949-50.

The direct application of 50 and 60 percent muriate of potash increased from 109,289 tons in 1949-50 to 189,838 tons in 1950-51. Such use for other potash materials was approximately the same as in 1949-50 except for manure salts and the sulfate. Consumption of manure salts decreased from 18,775 tons in 1949-50 to 8,440 tons in 1950-51, whereas sulfate increased from 13,902 to 18,703 tons in the respective years, reflecting the trend toward the use of more concentrated potash materials.

Nutrients

Commercial fertilizers contained 4,728,155 tons of nutrients in the year ended June 30, 1951. This consisted of 1,238,234 tons of nitrogen, 2,110,127 tons of available phosphoric oxide (P_2O_5) (total phosphoric oxide was 2,537,162 tons), and 1,379,794 tons of potash (K_2O). These tonnages, by States, are given in Table 7. The quantities contained in all fertilizers consumed in the United States for two earlier years is shown at the bottom of the same table. The 1950-51 figures for N,

TABLE 3

Consumption of Mixed Fertilizers, By Grades, in Each State and Region, Year Ended June 30, 1951

State	Fifteen Principal Grades Consumed in the Region Tons															All Other Mixtures		Total Tons
																Number1/	Tons	
New England																		
	5-10-10	6-9-12	0-14-14	5-8-7	6-3-6	8-12-16	0-20-20	8-16-16	7-7-7	5-10-5	6-9-6	8-12-12	5-7-10	10-10-10	8-8-10			
Maine	23,113	41,470	15,390 2/	4,938	0	20,208	102	5,357	908	1,007	8,869	6,311	6,072	346	3,349	36	15,596	152,933
New Hampshire	3,953	0	4,554	1,054	4	29	2,527	1,510	943	149	0	241	0	289	0	29	1,752	17,005
Vermont	7,279	0	8,394	744	0	152	5,223	4,286	911	591	0	164	0	923	0	37	3,751	32,418
Massachusetts	15,480	0	8,148	10,276	8,087	94	4,750	2,870	6,503	5,806	0	418	0	1,675	0	38	9,348	73,454
Rhode Island	5,459	0	1,188	1,728	0	0	164	222	928	1,167	0	169	0	181	0	27	3,001	14,205
Connecticut	7,819	0	1,289	7,886	15,088	0	2,859	1,166	3,085	2,723	0	980	0	930	0	51	11,458	55,243
Total	63,103	41,470	38,943	26,526	23,179	20,480	15,625	15,411	13,276	11,442	8,869	8,263	6,072	4,344	3,349	89	44,906	346,258
Middle Atlantic																		
	3-12-6	5-10-10	5-10-5	4-12-8	4-8-12	0-20-20	6-12-6	0-14-7	4-12-4	3-9-12	10-10-10	0-14-14	4-12-12	0-12-12	7-7-7			
New York	40,375	95,457	161,028	5,622	20,370	14,466	28,954	1,078	8,328	1,390	15,136	3,504	14	180	4,067	64	42,622	442,591
New Jersey	10,598	115,488	29,372	19,613	408	3,729	444	779	640	13,606	1,431	5,910	1	2,686	8,843	47	19,380	232,808
Pennsylvania	245,263	89,757	26,254	18,985	13,402	10,646	3,227	12,820	12,246	493	6,970	4,294	18,292	6,356	2,501	73	47,293	518,798
Delaware	16,692	16,813	3,002	5,569	4,661	870	0	767	75	3,718	398	2,135	71	2,026	66	31	9,548	84,191
District of Columbia	169	0	700	2	161	0	0	6	33	0	3	0	0	3	7	16	410	1,474
Maryland	106,016	18,821	19,997	14,684	27,225	941	0	7,103	1,185	6,081	586	3,277	97	5,477	2,178	51	34,818	244,166
West Virginia	15,781	10,260	3,033	4,223	0	5,641	0	9,673	7,988	0	474	816	234	1,199	16	25	3,916	63,253
Total	432,874	342,596	243,386	68,678	66,227	36,093	32,625	32,226	30,495	25,288	25,000	19,936	18,709	17,906	17,357	121	157,688	1,567,081
South Atlantic																		
	3-9-6	4-10-6	4-8-6	3-9-9	2-12-12	3-12-6	4-8-8	5-10-5	6-8-6	0-14-14	4-7-5	4-6-8	4-9-3	5-10-10	3-12-12			
Virginia	77,054	14,124	0	3,960	131,604	187,754	0	61,876	22,772	57,935	0	0	4,065	15,458	8	39	130,172	676,782
North Carolina	478,268	356,292	0	85,370	149,339	88,977	1,591	46,442	63,731	62,902	0	0	48,894	51,530	0	17	98,380	1,531,724
South Carolina	82,358	243,710	0	161,172	0	17,895	34,232	53,836	7,610	968	0	0	0	4,400	47,739	19	26,266	679,176
Georgia	54,046	3,293	635,288	93,181	19,394	3,206	100,684	7,753	47,790	627	0	0	5,379	6,860	4,834	93	153,724	1,036,069
Florida	0	928	49,197	2,864	768	551	73,900	4,771	5,873	614	118,826	85,695	24,671	2,133	1,068	596	545,413	917,272
Total	691,726	618,347	684,485	346,547	301,105	298,383	210,407	174,677	147,776	123,046	118,826	85,695	83,009	80,381	53,649	686	952,952	4,841,011
East North Central																		
	3-12-12	2-12-6	0-20-20	3-9-18	3-18-9	4-16-16	0-12-12	4-12-8	5-10-10	0-9-27	0-20-10	8-8-8	10-10-10	2-16-8	5-20-20			
Ohio	468,187	192,320	19,283	4,700	37,181	2,872	22,625	20,804	48,027	662	2,264	5,966	3,614	0	3,922	58	53,530	886,857
Indiana	526,283	66,428	29,885	34,685	23,342	27,706	20,591	11,298	6,572	9,472	896	12,187	8,680	24	5,497	49	37,602	820,168
Illinois	251,599	12,665	10,647	40,103	4,931	25,415	8,914	16,524	6	6,521	5,292	8,740	8,496	0	337	47	37,784	437,875
Michigan	177,846	89,924	24,875	14,626	38,499	17,846	11,423	10,526	464	4,257	3,787	3,484	2,666	28,661	194	25	28,411	487,479
Wisconsin	162,423	5,268	43,806	24,731	5,683	16,268	5,457	7,747	61	19,778	28,036	2,711	5,629	0	8,765	51	29,985	366,648
Total	1,586,338	368,506	128,496	118,845	109,656	89,807	68,010	66,899	55,120	40,690	40,275	33,088	29,284	28,685	18,715	99	187,312	2,967,705

CONTINUATION TABLE 3

West North Central

	3-12-12	6-12-4	2-12-6	4-24-12	4-16-0	10-20-0	8-24-8	4-16-16	0-20-20	3-9-18	8-32-0	4-12-8	8-8-8	4-16-8	0-20-10			
Minnesota	23,916	26	0	26,462	42	911	3	22,525	15,720	266	1,291	0	30	4,126	13,178	55	44,898	152,383
Iowa	63,702	3,946	7,741	639	34,702	12,117	376	9,242	2,365	2,626	10,887	21,379	1,064	19,144	3,321	59	80,306	242,368
Missouri	86,804	109,194	84,687	23,443	1,624	6,767	30,492	280	11,102	24,182	918	3,680	22,920	0	2,202	18	40,988	386,983
North Dakota	727	0	26	2,527	62	70	0	940	183	0	1,174	0	0	88	266	30	4,164	10,226
South Dakota	76	77	0	33	1,441	870	2	14	8	3	30	26	32	87	81	22	1,421	4,200
Nebraska	0	135	6	11	1,603	6,679	264	0	75	0	3,063	19	75	0	0	23	6,993	17,913
Kansas	1,021	16,042	7,326	641	6,804	16,981	4,394	0	70	73	9,224	96	701	16	316	35	7,660	70,664
Total	166,046	129,419	69,784	52,546	46,278	42,395	35,531	32,001	29,523	27,152	26,577	25,099	24,822	23,461	19,364	94	166,629	884,627

East South Central

	4-10-7	8-8-4	5-10-5	6-8-8	3-9-6	2-12-6	6-8-6	0-14-10	6-12-12	4-12-8	4-8-8	0-14-14	4-12-4	0-12-12	3-12-12			
Kentucky	0	0	975	6	50,309	95,091	97,358	90	2,385	48,617	763	2,526	8,026	18,741	26,407	46	63,397	414,891
Tennessee	41	10,993	7,299	10,635	114,047	17,001	5,240	2	52,886	5,145	51,834	1,269	32,482	20,342	6,458	34	53,395	389,069
Alabama	421,866	216,574	6,167	55,413	0	0	54	64,593	0	0	72	38,307	58	0	0	22	27,966	829,069
Mississippi	2,096	27,451	165,285	111,523	0	0	44	1,586	0	0	0	4,961	0	5	0	17	17,395	350,336
Total	424,001	254,018	179,726	177,577	164,356	112,092	102,696	66,181	55,271	53,762	52,669	47,063	40,566	39,088	32,865	73	162,153	1,983,064

West South Central

	6-10-6	4-12-4	8-8-8	3-9-18	6-8-12	0-14-7	5-12-12	6-10-4	6-8-8	12-12-12	4-12-8	12-24-12	10-20-10	6-12-6	10-10-0			
Arkansas	63,067	18,697	4,848	51,185	48,609	1,279	1,411	6	440	6,397	0	969	3,634	38	0	37	15,387	213,766
Louisiana	44,189	28,242	35,489	168	2,185	4,354	18,157	3,265	12,679	4,096	11,039	1,394	263	0	121	19	8,019	174,460
Oklahoma	28,621	21,180	817	1,319	36	1,120	148	957	0	197	0	581	263	1,647	28	25	9,004	66,510
Texas	136,597	41,912	16,092	6	502	37,450	572	9,988	79	1,585	43	6,094	4,573	6,771	6,920	48	13,993	282,164
Total	272,474	110,031	56,046	52,678	51,332	44,183	20,288	14,212	13,198	12,275	11,082	9,038	8,733	8,456	7,069	77	46,803	736,898

Mountain

	10-10-0	10-20-0	10-16-8	14-6-0	10-18-6	12-24-0	6-30-0	10-10-6	10-10-10	6-10-4	7-21-7	14-7-0	14-14-7	10-12-18	6-24-6			
Montana	0	1,488	26	0	135	0	351	20	0	8	0	0	0	0	0	8	246	2,286
Idaho	2,663	1,290	863	0	146	0	766	938	0	27	0	0	0	0	0	21	745	7,428
Wyoming	44	219	0	0	141	0	2	0	0	0	0	0	0	0	0	8	347	753
Colorado	2	963	3,979	0	2,766	3,146	547	210	368	441	1,143	0	0	1,002	968	30	3,649	18,974
New Mexico	749	143	0	0	0	0	0	36	0	171	0	0	0	0	0	15	797	1,896
Arizona	9,817	7,222	0	3,602	0	0	0	478	1,064	8	0	1,069	976	0	0	27	3,346	27,682
Utah	54	435	65	0	52	0	423	17	0	642	30	0	45	0	0	19	567	2,330
Nevada	0	100	0	0	0	0	0	11	0	0	0	0	0	0	0	11	150	241
Total	13,429	11,860	4,932	3,602	3,240	3,146	2,079	1,709	1,422	1,289	1,173	1,069	1,021	1,002	968	77	9,827	61,540

Pacific

	10-10-5	17-7-0	8-8-4	6-10-4	8-10-12	16-8-4	8-10-10	6-9-6	10-16-8	4-10-10	10-10-10	10-20-0	6-20-20	10-10-0	10-12-10			
Washington	967	0	0	3,148	0	0	7,897	0	1,748	46	150	660	1,712	13	0	80	12,891	29,232
Oregon	335	3	0	1,763	0	0	2,614	1	5,571	4	16	1,250	2,101	377	0	46	10,140	24,175
California	37,257	31,634	20,505	13,476	13,084	11,620	0	9,732	586	6,150	5,347	2,806	0	3,014	2,822	322	61,974	219,807
Total	38,559	31,637	20,505	18,387	13,084	11,620	10,511	9,733	7,905	6,200	5,513	4,716	3,813	3,404	2,822	385	85,005	273,214

Territories 3/

	14-6-10	12-6-10	12-4-10	14-4-10	7-8-10 2/	16-4-7	13-3-12	14-6-8	16-3-12	18-4-7	10-10-5	12-6-8	6-8-10	12-8-14	10-10-6			
Puerto Rico	43,794	40,607	30,600	20,313	17,969	17,261	16,854	15,365	11,891	8,677	7,944	7,451	3,672	3,344	3,258	30	34,637	283,725

1/ The number of mixtures shown for each State and Region is exclusive of mixtures not specified by grade, although the tonnages of such mixtures are included in the totals.
2/ In the 1949-50 report this grade was reported to be 23,579 tons. It should have been 12,243 tons.
3/ All grades consumed in Hawaii are produced by one manufacturer to comply with specifications by consumers. In Alaska, grades consumed were 8-16-8, 10 tons; 7-6-19, 2 tons; 10-10-6, 10 tons; 10-18-8, 25 tons; 10-20-10, 35 tons; 10-20-20, 20 tons, other 5 tons.

available P_2O_5, and K_2O are 23.2, 8.2, and 25.1 percent larger, respectively, than those for 1949-50; and 34.6, 8.7, and 28.6 percent larger than for 1948-49. In 1950-51, the total quantity of nutrients increased 16 percent whereas the quantity of fertilizers supplying these nutrients increased only 14 percent. This reflects the trend toward higher analysis fertilizers further evidenced by the increasing nutrient content of commercial mixtures as was seen in Table 4.

Although a larger consumption of nutrients was recorded for the United States in 1950-51, consumption in a number of States was less than for 1949-50. The percentage increase or decrease in nutrient consumption in 1950-51 compared with 1949-50, by States, is shown in Figure 2. Those States consuming less nitrogen used a total of 39,880 tons in 1949-50 and 35,866 tons in 1950-51, a decrease of only 4,014 tons. Similar comparisons for P_2O_5 and K_2O show decreases of only 22,760 and 6,225 tons, respectively.

Literature Cited

(1) Walter Scholl and H. M. Wallace, Agricultural Chemicals, Vol. 6, No. 6, 31-37 (1951); Commercial Fertilizers, Vol. 82, No. 6, 21-22, 24-25, 27-28, 30-32 (1951).

(2) U. S. Department of Agriculture, Agricultural Statistics 1947, Table 663, page 560.

(3) ...., Agricultural Statistics 1947, Table 661, page 558.

Kentucky Tour Successful

The second Green Pastures Tour in Kentucky was held April 22-24 and was an excellent object lesson in the economics of pastures as a source of real farm profit. Six counties were covered, and it was found that all agricultural agencies in the area are fully in support of the Green Pastures movement.

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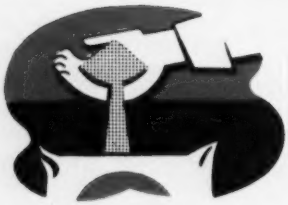
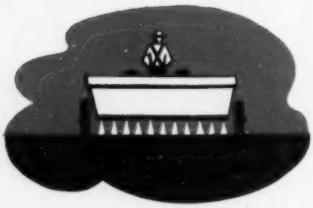
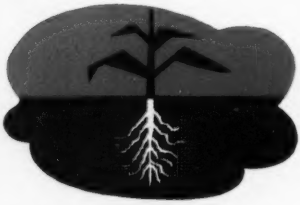


STORAGE CONTROL—No caking or lumping while in storage.



APPLICATION CONTROL—No dusting or bridging; drills free and even.



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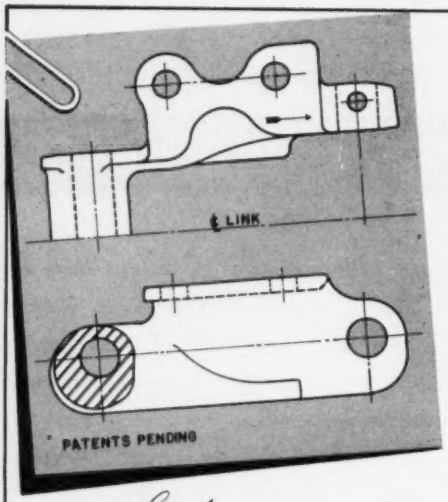

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this chain, Beaumont "Dura-Tred" Beauco-CR Chain, is the result of 3 years of research and testing by engineers of Beaumont Birch Co. and operators of nationally known fertilizer plants. It is 10 times more resistant to the acids in fertilizers than malleable iron.

Space will not permit us to note all of the design features of this chain and the advantages of Beauco-CR however this chain has proved to be so durable and efficient in use that... we guarantee that Beaumont "Dura-Tred" Beauco-CR Chain will lower your elevator maintenance costs.

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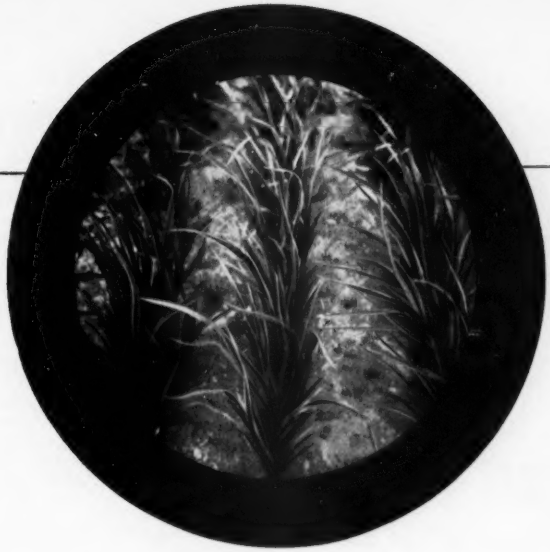
oats — **showing magnesium deficiency**



When oats are starved for magnesium, plants are yellow streaked and stunted. Last in a series of six advertisements showing magnesium deficiency symptoms in tobacco, cotton, grapefruit, corn, potatoes and oats.

You can supply magnesium

in the most effective way

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Water-Soluble
Double Sulfate of Potash-Magnesia

A lack of magnesium in the soil can seriously affect the growth of large acre yields of high-quality crops. There are probably farmers in the territory you serve who are not getting the good results they could because they are not supplying soluble magnesium to meet the deficiency of this plant food element in the soil.

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MURIATE OF POTASH **SULFATE OF POTASH**

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- Promotes earlier maturity on soils low in magnesium.
- Enables crops to make better use of other plant foods.
- Carries phosphorus to the growing and fruiting parts of the plant.
- Necessary for the development of seed.
- Promotes the formation of proteins in growing crops.
- Stimulates growth of soil bacteria and fixation of nitrogen by legumes.
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TABLE 4

Weighted Average Plant-Nutrient Content of Commercial Mixtures Consumed in the United States, Year Ended June 30, 1951, and 1950 Total

State & Region	Year Ended June 30, 1951				Year Ended June 30, 1950
	Nitrogen	Available Phosphoric Oxide	Potash	Total	Total
	Percent	Percent	Percent	Percent	Percent
Maine	5.85	10.94	12.85	29.34	29.51
New Hampshire	3.81	13.28	13.01	29.80	30.71
Vermont	3.45	14.06	14.07	31.58	33.47
Massachusetts	4.83	10.44	10.75	26.02	24.41
Rhode Island	4.99	10.20	9.55	24.74	26.13
Connecticut	5.87	8.70	8.80	23.37	22.96
New England	5.21	10.86	11.61	27.67	27.91
New York	5.01	11.52	8.24	24.77	24.27
New Jersey	4.74	10.69	9.66	25.09	24.67
Pennsylvania	3.81	12.41	8.47	24.69	23.90
Delaware	3.79	10.81	9.50	24.10	23.69
District of Columbia	5.50	9.84	6.04	21.38	24.94
Maryland	3.58	11.53	8.16	23.29	22.89
West Virginia	2.99	13.18	8.75	24.92	23.44
Middle Atlantic	4.22	11.73	8.59	24.54	23.95
Virginia	2.96	11.16	8.63	22.74	21.75
North Carolina	3.80	9.93	7.68	21.28	20.90
South Carolina	3.75	9.94	7.15	20.84	20.76
Georgia	3.94	8.78	7.12	19.81	18.72
Florida	4.92	7.06	7.88	19.86	19.06
South Atlantic	3.82	9.31	7.71	20.84	20.19
Ohio	2.96	12.69	11.09	26.74	26.09
Indiana	2.94	12.73	12.70	28.37	26.77
Illinois	3.23	12.32	13.30	28.87	27.48
Michigan	2.65	13.66	11.50	27.81	26.71
Wisconsin	2.44	13.97	15.40	31.81	29.64
East North Central	2.89	12.98	12.46	28.30	26.68
Minnesota	3.35	19.06	14.13	36.53	35.17
Iowa	4.41	16.31	7.73	28.45	26.76
Missouri	4.13	14.21	9.02	27.36	26.27
North Dakota	3.92	29.23	9.97	43.12	36.25
South Dakota	6.88	18.38	1.62	26.88	23.57
Nebraska	9.24	21.65	1.29	32.18	30.92
Kansas	8.26	18.08	3.25	29.49	26.30
West North Central	4.36	16.24	8.91	29.61	28.18
Kentucky	3.84	10.88	7.88	22.40	22.40
Tennessee	3.76	10.08	8.32	22.12	20.96
Alabama	4.11	10.03	7.29	21.43	20.81
Mississippi	6.52	9.62	6.69	21.83	21.02
East South Central	4.16	10.17	7.52	21.85	21.07
Arkansas	5.04	10.10	11.04	26.18	24.62
Louisiana	5.84	10.70	7.23	23.47	22.39
Oklahoma	4.76	12.04	5.22	22.02	25.14
Texas	4.94	11.64	5.74	22.32	21.25
West South Central	5.09	11.01	7.58	23.68	22.73
Montana	9.84	21.18	1.02	31.71	31.04
Idaho	9.80	15.21	2.91	27.92	27.20
Wyoming	10.76	19.79	4.06	35.60	32.32
Colorado	9.64	20.51	3.46	33.40	34.07
New Mexico	8.23	11.08	2.06	21.37	23.39
Arizona	10.90	14.16	1.41	26.49	27.16
Utah	9.10	18.24	3.00	30.34	27.91
Nevada	7.88	14.52	3.73	26.13	24.92
Mountain	10.16	16.88	2.96	29.70	30.07
Washington	6.82	13.10	10.28	30.20	26.63
Oregon	8.03	15.12	8.80	31.95	30.65
California	10.26	10.79	5.86	26.91	26.47
Pacific	9.69	11.02	6.19	26.90	26.20
Continental U. S.	4.00	11.16	8.83	24.09	23.14
Hawaii	11.14	8.46	16.50	36.12	35.09
Puerto Rico	11.86	8.66	9.74	28.96	26.21
Alaska	9.47	17.30	10.28	37.44	---
Territories	11.49	6.11	10.81	28.41	26.08
U. S. Average: 1950-51	4.18	11.03	8.98	24.19	
1949-50	4.02	10.93	8.29	23.24	
1948-49	3.99	10.78	7.78	22.56	

Tables Continued on Page 36

Safety

Asheville Meeting

The Fertilizer Section of the North Carolina Safety Conference held its first meeting on May 6, 1952.

There were 45 delegates present at the meeting. C. J. Watts, Jr., Assistant Manager, Naco Fertilizer Company, Wilmington, North Carolina, was elected Chairman for the May 1953 meeting. The place and exact date of the 1953 meeting will be determined by the Executive Committee at an early date.

Visual - aid - demonstration talks were made by Tom Clarke, Personnel Director, G.L.F. Exchange, Ithaca, New York; and E. O. Burroughs, Manager, Insurance Department, F. S. Royster Guano Company, Norfolk. Tom Clarke's talk was of the audience-participation type. He showed slide-film pictures illustrating incorrect and unsafe acts in fertilizer manufacturing plants. He then asked different, individual, delegates from the audience to describe the unsafe act. If the delegate was able to correctly do so, the speaker rang a bell and the delegate was awarded a cigar. If he failed to describe the unsafe act correctly, the gong sounded and the delegate was awarded one-half a cigar.

J. S. Fields, Chairman of the Fertilizer Section of the National Safety Council spoke on "Fertilizer Safety on a Nation-wide Basis."

R. E. Reitz, supervisory safety engineer, Glens Falls Indemnity Company, State Planters Bank Building, Richmond, Virginia outlined how to proceed in organizing an Accident Prevention Program in a fertilizer manufacturing plant.

The meeting was opened by Vernon S. Gornto, Secretary, Fertilizer Section, National Safety Council. Mr. Gornto introduced a number of distinguished guests and then introduced the Fertilizer Safety Section Chairman for the 1952 meeting, C. J. "Tex" Watts, Jr.

your advance SALESMAN

FOR FERTILIZER IN COTTON PRINT BAGS

half page Sept. PROGRESSIVE FARMER

Yes, farm families will be looking for Fertilizer in **Cotton Print Bags** this fall, and at the same time, they'll be thanking the manufacturer who packs in Cotton Bags for making it possible to recover container costs—in valuable Cotton Cloth. Write now for complete details on how to boost YOUR sales with Cotton Print Bags.

REACHING 1,190,000 SOUTHERN FARMERS with the coupon that SELLS YOUR BRAND!

(We Send the Booklet — You Get the Credit)

BUY FERTILIZER IN

cotton print bags

GET 21½ YARDS OF SEWING MATERIAL WITH EVERY TON

ENOUGH FOR FIVE SMART DRESSES

Think of it... FIVE dresses with each ton of fertilizer you buy in Cotton Print Bags. Your progressive fertilizer manufacturer helps you recover container costs by packing his product in re-usable Cotton Bags — dress prints, quality sheeting, and serviceable toweling. Regardless of what the container is made of, YOU, the customer, are the one who pays for it! Why pay for bags that are a dead expense? Insist on Cotton Bags and get back the entire container cost in valuable sewing material.

Buy your fertilizer in Cotton Bags... and save money by the ton!

free PATTERN SERVICE for Sewing with Cotton Bags

This valuable booklet will be sent to you with the compliments of your manufacturer who packs his product in Cotton Bags. Just mail the coupon with your name and address and give the brand name of the fertilizer you buy.

NATIONAL COTTON COUNCIL
P. O. Box 76
Memphis 1, Tennessee

Send me 1952 **Pattern Service for Sewing with Cotton Bags**

Name_____
Address_____
City_____ State_____
Brand of fertilizer I prefer_____

NATIONAL COTTON COUNCIL • P. O. BOX 76 • MEMPHIS 1, TENNESSEE

TABLE 6

Principal Fertilizer Materials Consumed as such, by States and Regions,

Year Ended June 30, 1951[1]

Tons

State & Region	Ammonium Nitrate	Ammonium Sulfate	Calcium Cyanamide	Sodium Nitrate	Other Chemical Nitrogen Materials	Dried Manures	Other Organics	Phosphate Rock[2]	Superphosphates 16-20 Percent	Superphosphates 30-50 Percent	Other Phosphates	Muriate of Potash 50 & 60%	Other Potash Materials	Minor and Secondary Elements	Total
Maine	1,982	246	206	399	72	786	187	16	8,286	3	210	186	6	54	12,016
New Hampshire	411	7	38	182	69	129	262	43	7,964	0	99	141	52	16	9,445
Vermont	317	462	15	124	60	72	24	206	28,720	0	143	442	0	28	30,612
Massachusetts	786	263	179	1,851	76	2,136	4,736	298	9,839	0	1,198	706	0	67	22,096
Rhode Island	26	189	15	163	62	319	934	30	1,617	0	148	80	3	6	3,531
Connecticut	414	252	85	1,344	149	958	14,814	316	8,978	34	1,665	1,782	2,222	786	33,710
New England	3,336	1,389	537	4,043	498	4,379	20,947	927	66,384	37	3,443	3,286	2,283	918	111,409
New York	5,873	659	1,077	6,506	611	2,974	5,962	1,418	157,240	68	936	643	48	307	184,308
New Jersey	1,836	329	2,336	5,161	320	2,615	1,802	773	8,675	6	1,982	1,200	214	133	26,071
Pennsylvania	1,673	1,464	1,473	2,313	292	3,814	4,790	2,342	84,145	60	1,636	566	41	1,976	106,585
Delaware	483	8	37	268	48	99	146	145	1,612	1	43	98	0	95	3,078
District of Columbia	1	0	0	96	0	204	233	0	62	8	98	1	0	22	719
Maryland	804	71	682	2,494	317	966	270	1,064	23,784	3	398	455	70	236	31,620
West Virginia	454	349	1	1,441	108	198	121	180	33,582	1,253	62	78	0	14	37,821
Middle Atlantic	10,825	2,886	5,606	18,279	1,696	10,870	13,314	6,919	309,090	1,396	5,149	3,039	373	2,802	389,202
Virginia	3,496	2,269	1,169	33,144	16,531	565	784	554	60,084	6,261	3,325	1,254	7,837	16,372	154,615
North Carolina	13,181	5,206	12,091	167,894	60,216	673	3,157	1,144	42,620	2,216	11,382	11,104	4,062	34,856	367,802
South Carolina	24,402	8,397	2,677	100,260	44,733	268	662	1,036	66,540	25	10,242	15,967	5,745	2,471	280,313
Georgia	16,143	1,743	1,280	94,116	19,161	808	747	1,100	74,983	1,176	30,190	14,008	3,713	17,726	275,895
Florida	3,408	2,043	2,234	13,236	8,367	1,026	6,368	7,289	16,494	86	4,230	4,592	12,876	3,082	85,090
South Atlantic	59,630	19,657	19,451	408,362	148,998	3,339	11,598	11,123	260,691	9,731	59,369	46,715	34,263	76,508	1,163,416
Ohio	6,282	6,435	3,148	1,446	913	1,641	5,782	8,890	27,484	1,918	1,007	871	191	76	66,071
Indiana	32,001	3,302	2,644	1,155	2,313	430	1,747	44,543	17,922	4,230	527	3,251	297	139	114,501
Illinois	24,026	9,127	941	592	7,473	3,629	6,610	601,219	44,893	4,660	2,834	32,004	1,101	27	739,035
Michigan	6,413	2,688	309	773	578	1,034	7,206	3,317	20,626	2,691	1,302	863	0	491	48,160
Wisconsin	8,011	477	3	2	156	868	3,296	22,286	3,860	216	444	3,954	269	342	43,887
East North Central	76,732	21,999	7,045	3,968	11,435	7,302	24,642	680,244	114,785	13,812	6,114	40,943	1,858	1,075	1,011,654
Minnesota	5,053	234	30	0	124	1,207	2,089	5,120	15,694	14,243	4,840	218	0	51	48,604
Iowa	21,010	2,861	526	0	2,610	44	1,222	30,266	68,175	5,060	9,676	2,218	0	36	143,692
Missouri	24,798	2,431	186	394	9,721	477	1,944	170,258	23,897	8,447	2,391	8,193	212	0	250,346
North Dakota	314	3	0	0	1	0	20	120	272	2,316	672	29	0	232	3,979
South Dakota	618	312	60	0	20	15	35	170	2,030	940	298	22	0	0	4,520
Nebraska	16,017	8,999	100	0	10,741	27	195	792	4,362	7,109	1,489	155	0	0	49,944
Kansas	23,374	4,062	60	1,131	361	216	507	19,097	12,302	44,101	9,756	119	0	0	115,086
West North Central	91,184	18,902	962	1,525	23,576	1,986	6,012	225,819	126,722	82,206	28,791	7,953	212	319	616,171
Kentucky	22,951	812	2,526	1,850	392	342	234	25,489	65,699	10,652	4,896	3,120	6,618	43	145,624
Tennessee	34,821	222	1,425	16,366	4,240	391	688	1,734	51,889	10,279	36,045	7,954	2,972	241	159,236
Alabama	40,966	4,879	2,888	113,025	9,960	418	224	1,494	90,649	639	201,787	10,385	2,004	1,333	478,991
Mississippi	85,408	45,695	6,740	63,478	45,679	29	80	4,857	57,932	566	118,345	26,241	336	10	462,399
East South Central	182,146	51,308	13,249	194,719	56,271	1,180	1,201	33,574	266,169	22,136	361,041	46,680	11,930	1,627	1,243,250
Arkansas	39,212	8,029	8,971	20,707	21,063	29	0	1,712	41,935	2,772	6,548	18,436	3,086	0	169,498
Louisiana	24,949	4,511	1,790	28,019	23,985	150	90	8,476	29,685	1,661	20,450	7,350	208	5	150,327
Oklahoma	4,807	489	30	127	58	210	336	30,089	25,389	4,271	2,804	1,349	1	0	79,680
Texas	22,109	14,980	797	2,763	6,226	943	1,614	36,046	148,119	23,907	60,145	1,632	76	6,099	327,458
West South Central	90,777	28,009	9,588	51,616	50,331	1,332	2,040	76,323	255,126	32,611	89,947	28,786	3,370	6,104	726,960
Montana	2,880	3,099	0	0	180	0	102	40	60	10,362	1,881	5	0	881	18,580
Idaho	2,888	7,688	40	0	0	0	0	454	14,146	11,880	276	81	0	2,463	39,863
Wyoming	80	410	0	0	0	0	89	54	1,313	3,565	0	0	0	80	5,551
Colorado	5,028	5,070	8	32	2,502	92	679	0	3,416	12,780	1,548	162	58	435	31,807
New Mexico	1,120	1,612	0	0	1,473	35	180	80	2,266	6,490	6,216	110	0	302	19,854
Arizona	10,522	10,536	898	1,701	23,908	825	180	0	5,516	3,855	15,342	20	423	2,792	76,518
Utah	4,078	10,514	0	0	160	25	80	163	5,424	4,046	1,254	193	5	361	26,283
Nevada	0	4	0	0	0	0	18	40	49	494	1	0	0	271	874
Mountain	26,270	38,933	946	1,733	28,193	977	1,286	801	32,170	53,442	28,189	551	486	7,355	219,330
Washington	8,729	8,911	109	377	7,395	1,560	3,109	492	11,696	4,345	5,151	1,512	13	3,616	57,015
Oregon	14,644	30,272	818	181	4,785	817	886	260	23,231	4,108	14,719	1,515	93	4,801	100,340
California	70,524	138,868	7,198	933	116,142	150,000[3]	50,405	409	67,984	16,581	47,082	1,568	3,552	540,525	1,228,768
Pacific	93,897	178,051	7,822	1,491	128,322	152,077	54,410	1,261	102,911	25,034	66,952	4,595	3,658	548,642	1,386,123
Continental U. S.	634,797	353,104	64,206	683,716	449,322	183,442	136,349	1,037,991	1,533,068	239,204	686,994	182,548	58,423	645,360	6,867,514
Hawaii	3,259	43,299	0	76	5,338	8	80	1,633	668	1	6,446	8,578	3,377	91	72,843
Puerto Rico	0	68,078	16	3	2,160	0	0	0	154	17	1,967	657	82	0	70,124
Alaska	120	10	0	3	1	0	0	0	0	180	40	58	0	0	409
Territories	3,379	108,387	16	84	7,499	8	80	1,633	809	198	10,453	9,290	3,459	91	143,376
Total: 1950-51	638,176	461,491	64,222	683,800	456,811	183,450	136,429	1,039,624	1,533,877	239,402	677,447	189,838	61,882	645,441	7,010,890
1949-50	577,562	234,664	61,678	627,424	264,676	165,219	127,984	749,263	1,856,777	265,165	687,026	109,289	59,610	439,607	6,045,704
1948-49	347,223	220,041	65,986	700,045	231,228	134,681	123,744	742,700	1,784,719	196,290	472,546	95,108	60,504	509,565	5,702,379

1/ Includes distribution by Government agencies, materials for mixing on the farm, and gypsum. Excludes agricultural lime and materials used by manufacturers in the formulation of commercial mixtures. Consumption of each commodity is shown, by regions, in Table 8.

2/ Includes colloidal phosphate, the quantity of which is shown separately, by regions, in Table 8.

3/ Estimated.

(Continued on page 40)

Safety on a NATIONAL BASIS

By J. S. FIELDS*

Chairman Fertilizer Section

Nat. Safety Council

Accident prevention and taxes have one outstanding characteristic in common: Each year we realize more and more how important both of them are to us and how much they influence our business and private lives and, accidents are just as sure as taxes unless management takes a firm stand and deliberately does something real and concrete to prevent them. Management must realize the fact that the causes of accidents and the causes of operating troubles are the same. Accident prevention which embodies the control of employee work performances, the elimination of hazardous conditions, unsafe construction and faulty methods of operation, is a matter of vital importance to the continued economic stability and harmonious employee relationship of any industrial organization.

The idea of a fertilizer safety section took concrete form during the National Safety Congress at Chicago, Illinois, in October, 1950. The total absence of any program pertaining to even the manufacturer of the prime products of the fertilizer industry such as anhydrous ammonia, ammonium nitrate, nitrogen solutions, ammonium sulfate, sulfuric acid or phosphate was very apparent. The extensive mixed fertilizer industry was not only ignored but apparently unheard of. A group decided to find out why the fertilizer industries had been ignored and attempt to do something about it. I wish to point out that all the group

*Presented at Fertilizer Section North Carolina Safety Conference, Asheville, North Carolina—May 6, 1952.

in this meeting were representatives of companies primarily producing the prime products of the fertilizer industry and each company had a well organized safety and fire prevention program with annual frequency rates far below the National averages for that type manufacture. So you can realize that the initiation of the program was not particularly for the reason of self benebit but to benefit the entire fertilizer industry which naturally includes the producers of the prime products. For example, Phillips Chemical Company with a total employment of approximately 2850 persons are engaged in the manufacture of anhydrous ammonia, nitric acid, prilled ammonium nitrate, nitrogen solutions, carbon black, butadiene and synthetic rubber, sulfur, and ammonium sulfate had a lost-time accident frequency rate of 1.8 for the year, 1950, and at the time of this writing the frequency rate is 0.70. After the Chicago discussion the first meeting was called in the offices of The Spencer Chemical Company at Kansas City, Missouri, on January 16, 1951. The next meeting was held in the offices of Phillips Chemical Company at Bartlesville, Oklahoma, on March 20, 1951, at which time the first officers were elected. The third meeting was held at Baltimore, Maryland, with the Davison Chemical Company as host at which time the first Fertilizer Safety Section Program in the history of The National Safety Congress was finalized for the October meeting for the year, 1951. A meeting of the advisory committee was held in the offices of The National Safety Council on December 5, 1951, at which time committee chairmen were appointed and the working program of The Fertilizer Safety Section started to function. Another first in the history of The Southern Safety Association which holds its conferences each year was the Fertilizer Safety Section meeting on March 3, at Atlanta, Georgia, which was well attended and the program well received. The road this far has not been easy and has required the sincere interest and work of many.

There may be some who are not familiar with the goals established for accomplishment by The Fertilizer Safety Section among which are:

1. Reduction in lost-time accident frequency and severity rates. 2. Reduction in workmen's compensation insurance rates. 3. Reduction in fire losses. 4. Lower fire insurance rates. 5. Safe and efficient work practices which will result in substantial reduction in operation and overhead cost. 6. Higher morale of employees.

Let us consider how these goals can be reached. The primary and basic steps towards any good safety and fire prevention program in any plant is in the engineering design and the policies of that company. Are you designing for safety to employees and for good fire prevention? Are all of your machines properly guarded? Does the electrical equipment in your plant comply with the National Electric Code for that type exposure? When tanks and piping are installed, do you follow the recommendations of the API-ASME or its equivalent code in these installations? What provisions have you already made to make it easy for your employees to work safely, for example: Good ventilation, good lighting and good housekeeping? What consideration have you given to corrosion when purchasing equipment? What type construction do you use in building your plants and/or warehouses, are they fire proof and if not, do you have automatic fire control or extinguishing equipment? Some will say all of the above is not practical in the fertilizer industry and the cost would make our business unattractive and non-profitable. Have any of you experienced how unprofitable a fire can be? After all is said and done, a fire can do more to interrupt continued supply of your products to your consumer and affect costs more than any other cause. Have you considered layout when building your plant to reduce by isolation the damage in event a fire does occur? In view of the present high fire insurance rates it is imperative

(Continued on page 69)

SACKETT FERTILIZER PROCESSING SYSTEMS PAY OFF

Control Panel

These fast fertilizer processing systems have reduced production costs in some plants as much as 65% . . . An estimated cost savings included with a Sackett survey of your production operations may even exceed this figure.

SACKETT ONE MAN BATCH-WEIGH SYSTEM

1. Eliminates waste of manpower.

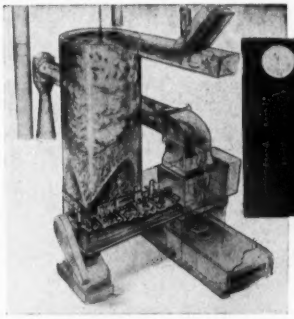
2. Fast-acting weigh valves and printed weigh record provides more rapid and accurate weighing.

3. Circular design of storage hopper accelerates flow of ingredients through weigh valves . . . no corners or valley angles to retard flow of material.

4. Its compact design permits installation in existing buildings with minimum alterations.

5. The installation of this system does not, in any way, disturb existing mixing facilities.

Built in four sizes, 25 tons to 100 tons per hour.



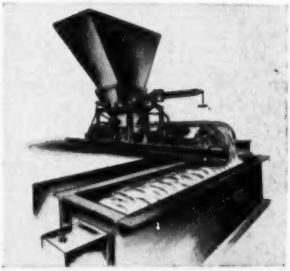
Central control panel shown above is nerve center of Super-Flo Process. Plant is operated from this point by one man.

SACKETT *Super-Flo*... A CONTINUOUS SUPERPHOSPHATE MANUFACTURING PROCESS

This new Sackett-conceived and developed process produces a superphosphate of premium quality in either powdered or granular form. Its complete mechanization and centralized panel control brings to the industry entirely new conceptions of high production speeds, low manufacturing costs and quality product control.

These Sackett patented processes are built in three sizes, 25 tons to 75 tons per hour.

Exclusive suspended acidulation produces highly converted superphosphate of excellent quality.



SACKETT CONTINUOUS AMMONIATING SYSTEM

The patented Sackett Continuous Ammoniation System is now being offered in four sizes with capacities ranging from 25 tons per hour to 100 tons per hour. This highly efficient method of ammoniating superphosphates and mixed goods with solutions offers many important advantages and is easily installed in connection with existing basing equipment. Higher ammoniation rates are made possible by its accurate proportioning of solids and solutions and lower reactive temperatures due to its exclusive aerating action which takes place during ammoniation. This system is also built in pressurized design for anhydrous ammonia or solutions having high vapor pressures.

SACKETT BALTIMORE

America's Foremost Designers and Builders

SUPERPHOSPHATE PLANTS • FERTILIZER MIXING PLANTS • RELATED PRODUCTION EQUIPMENT

THE A. J. SACKETT & SONS CO., 1727 S. HIGHLAND AVENUE, BALTIMORE 24, MD.

Architects and Manufacturing Engineers to the Fertilizer Industry since 1897

TABLE 6

Commercial Fertilizers Distributed in the United States for Direct Use on the Land
Year Ended June 30, 1951[1]

Tons

Commodity	New England	Middle Atlantic	South Atlantic	East North Central	West North Central	East South Central	West South Central	Mountain	Pacific	Territories	Total
MIXTURES											
N-P-K grades	288,200	1,486,284	4,439,418	2,642,719	686,353	1,751,925	673,461	24,294	230,912	328,324	12,521,867
N-P grades	307	108	2,060	478	127,034	894	16,456	37,202	40,177	2,096	226,494
P-K grades	86,761	110,247	269,418	324,608	71,243	210,025	46,999	63	2,126	24	1,091,382
N-K grades	0	13	106,958	0	17	820	0	0	0	7,000	114,508
K grades[2]	0	429	23,160	0	0	0	0	0	0	0	23,589
CHEMICAL NITROGEN MATERIALS											
Ammonia - anhydrous	0	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]	[3]	118,423
Ammonia - aqua	0	[3] 0	[3] 0	[3]	[3] 0	[3] 0	[3]	[3]	[3]	0	17,669
Ammonium nitrate	3,338	10,823	59,630	78,732	91,184	182,146	90,777	26,270	93,897	3,379	638,176
Ammonium nitrate-limestone mixtures	261	602	136,714	6,155	7,843	17,936	17,489	1,960	3,473	0	192,431
Ammonium sulfate	1,389	2,856	14,687	21,999	18,902	61,508	28,009	38,933	175,051	108,387	461,491
Calcium cyanamide	537	5,606	19,451	7,045	962	13,249	8,688	946	7,822	16	64,222
Calcium nitrate	18	0	5,963	1,697	100	6,532	626	4,299	35,426	39	54,689
Sodium nitrate	4,043	16,289	408,562	3,988	1,626	194,719	51,616	1,733	1,491	84	683,800
Other[4]	219	1,094	6,331	3,686	15,636	31,803	32,216	21,934	89,424	7,450	73,809[5]
ORGANIC											
Blood, dried	0	122	131	0	0	0	0	0	1,009	0	1,262
Castor pomace	3,563	11	2,235	0	0	0	0	0	832	0	6,639
Compost and muck	0	0	384	0	0	0	0	0	0	0	384
Cottonseed meal[6]	8,760	6	966	0	0	69	0	0	57	0	9,858
Fish scrap and meal	974	1	2	0	0	0	0	0	1,034	0	2,011
Hoof and horn meal	119	0	0	0	0	0	0	0	0	0	119
Linseed meal	1,095	0	0	0	0	0	0	0	0	0	1,095
Manures, dried	4,379	10,870	3,359	7,502	1,966	1,180	1,332	977	152,077	8	183,460
Peanut meal	70	0	39	0	0	0	0	0	0	0	109
Sewage sludge, activated	6,184	9,141	4,437	24,310	6,012	1,142	2,040	1,285	11,333	80	63,964
Sewage sludge, other	0	0	0	174	0	0	0	0	38,249	0	38,423
Soybean meal	778	0	20	0	0	0	0	0	0	0	798
Tankage, animal	4	558	60	0	0	0	0	0	140	0	762
Tankage, garbage	0	0	462	0	0	0	0	0	800	0	1,262
Tankage, process	1,403	3,183	2,814	58	0	0	0	0	595	0	8,051
Tung pomace	0	0	60	0	0	0	0	0	0	0	60
Other	0	292	0	0	0	0	0	0	363	0	655
PHOSPHATES											
Ammonium phosphate, 11-48	0	0	0	43	1,983	0	1,589	993	8,898	4,075	17,581
Ammonium phosphate, 16-20	0	0	0	1,232	14,335	328	60,737	20,466	66,022	4,455	167,581
Ammonium phosphate, 13-39	0	0	0	196	6,809	0	4,595	2,080	0	0	13,680
Ammoniated superphosphate	0	665	421	0	0	0	3,734	101	2,817	1,945	9,683
Basic lime phosphate	0	0	2,233	5	0	359	0	0	0	0	2,597
Basic slag	0	25	47,702	25	0	342,317	16,968	0	0	0	407,035
Bonemeal, raw	231	1,138	947	112	48	112	1,595	2	1,978	0	6,163
Bonemeal, steamed	2,610	3,119	238	1,468	143	159	99	1	57	0	7,892
Calcium metaphosphate	100	202	2,267	3,036	5,456	4,682	632	0	450	0	16,804
Fused tricalcium phosphate	0	0	5,561	0	0	12,169	0	0	0	0	17,730
Phosphoric acid	0	0	0	0	89	355	0	2,845	7,080	0	9,987
Phosphate rock	807	5,799	9,801	664,918	216,411	26,477	70,638	801	811	1,633	998,896
Colloidal phosphate	120	120	1,522	15,326	10,408	7,097	7,885	0	450	0	42,728
Precipitated bone	502	0	0	0	0	0	0	0	0	0	502
Superphosphate, 18%	12,447	43,273	143,085	38,195	16,416	66,188	63	20,818	24,619	0	364,070
" 19%	6,007	154	7,618	188	1,190	1,892	736	7,144	9,289	0	34,218
" 20%	46,930	265,663	109,988	76,402	109,117	199,132	264,357	4,206	69,003	809	1,136,589
" 32%	0	1	980	104	32	12	1,867	239	0	0	3,036
" 42%	0	0	0	0	18,888	0	0	38,002	4,724	0	61,411
" 43%	0	0	0	5	1,216	0	0	1,005	223	0	2,448
" 44%	0	0	0	0	0	0	40	0	0	0	40
" 45%	0	640	680	6,385	28,846	1,377	27,284	8,309	1,837	16	75,374
" 46%	3	655	0	2,498	12,279	1,533	696	6,118	292	0	23,072
" 47%	34	10	264	818	3,012	1,259	256	50	0	0	5,403
" 48%	0	60	5,588	2,440	13,279	11,566	890	549	17,876	182	52,222
" 49%	0	30	364	236	1,424	4,281	1,342	130	80	0	7,887
" 50%	0	0	855	1,428	3,434	2,317	476	0	0	0	8,510
Other (16% P_2O_5)	0	0	0	0	0	562	0	0	0	0	562
POTASH MATERIALS											
Carbonate	0	0	62	0	0	0	0	0	0	0	62
Cement flue dust	0	0	7,317	0	0	0	0	0	0	0	7,317
Cotton hull ash	1,451	1	0	0	0	25	0	0	0	0	1,477
Magnesia sulfate	103	36	2,166	825	148	1,224	928	0	0	666	6,093
Manure salts, 22-30%	0	16	4,716	822	68	437	2,383	0	0	0	8,440
Muriate, 50%	198	630	39,800	17,699	803	30,416	21,618	124	29	0	110,617
Muriate, 60%	3,088	2,409	7,218	23,344	7,480	16,264	7,168	427	4,566	7,290	79,221
Nitrate	383	0	6,754	0	0	12	9	0	0	0	7,158
Phosphate ash	0	0	1,879	0	0	1,978	0	0	0	0	3,857
Sodium nitrate	72	28	289	1	0	1,814	0	21	0	0	2,223
Sulfate	274	106	4,747	170	0	6,441	50	465	3,866	2,793	18,703
Tobacco stems	0	3	1,736	0	0	0	0	0	0	0	1,739
Wood ashes	0	0	4,411	0	0	0	0	0	0	0	4,411
Other	0	185	177	40	0	0	0	0	0	0	402
MINOR AND SECONDARY ELEMENT MATERIALS[6]											
*Ammonium sulfate	0	11	2	5	0	0	60	0	0	0	78
Borax	72	207	219	376	14	413	3	10	772	0	2,086
Copper sulfate	8	29	39	144	2	2	0	0	30	0	254
Iron sulfate	0	0	0	22	0	0	0	2	2	0	26
Land plaster (gypsum)	746	2,321	73,716	65	236	1,194	877	8,801	521,944	0	606,897
Lime sulfur solution	0	0	0	0	0	0	0	0	4,902	0	4,902
Magnesium sulfate	87	1	0	70	0	0	0	0	20	0	148
Manganese sulfate	16	42	84	232	68	0	4	10	0	0	452
Soil sulfur, 98-99+%	11	90	490	139	0	4	2,380	1,471	16,841	0	21,426
Sulfuric acid, 40-93%	0	0	0	0	0	4	0	2,014	0	0	2,018
Zinc sulfate	0	5	15	3	2	9	0	0	21	91	146
Minerals not segregated	9	98	1,944	21	0	5	2,780	87	2,086	0	7,008
TOTAL	486,667	1,986,283	6,004,428	3,979,359	1,800,798	3,206,314	1,463,888	280,878	1,659,337	480,820	20,988,740

1/ Includes distribution in the Territories and by Government agencies. Does not include materials for manufacture of commercial mixtures.
2/ Lime-potash mixtures. Cement flue dust shown under "Potash".
3/ Included with "Other".
4/ Ammonia, anhydrous and aqua; ammonium sulfate-nitrate; nitrogen solution, urea, and similar materials not segregated. Grand total averages 82% nitrogen.
5/ Excludes above totals for ammonia, anhydrous, and aqua.
6/ Excludes materials distributed by other than manufacturers of commercial fertilizers.
*Should read "Aluminum Sulfate", not "Ammonium."

TABLE 7

Consumption of Plant Nutrients, By States and Regions,

Year Ended June 30, 1961[1]

Tons

State & Region	In Mixtures					In All Fertilizers				
	Nitrogen	Phosphoric Oxide		Potash	Total N, Avail. P_2O_5, & K_2O	Nitrogen	Phosphoric Oxide		Potash	Total N, Avail. P_2O_5, & K_2O
		Available	Total				Available[2]	Total[3]		
Maine	8,951	16,725	17,395	19,200	44,876	9,632	18,369	19,069	19,339	47,340
New Hampshire	597	2,259	2,327	2,212	5,068	813	3,959	4,116	2,314	7,086
Vermont	1,119	4,589	4,712	4,580	10,238	1,363	10,488	10,951	4,836	16,687
Massachusetts	3,845	7,669	7,994	7,896	19,110	4,599	10,113	10,623	8,398	23,107
Rhode Island	709	1,449	1,534	1,388	3,514	879	1,808	1,911	1,396	4,083
Connecticut	3,079	4,808	5,112	4,861	12,748	4,833	7,221	7,692	6,846	18,700
New England	18,000	37,469	39,074	40,085	96,554	21,919	51,958	54,361	43,126	117,003
New York	22,155	80,975	83,177	36,477	109,607	26,241	85,446	87,319	36,956	146,643
New Jersey	11,026	24,869	26,107	22,482	58,356	13,017	27,134	28,524	23,195	63,346
Pennsylvania	19,767	64,367	66,818	43,981	128,076	21,867	82,478	86,308	44,405	148,770
Delaware	2,432	6,939	7,240	6,101	16,472	2,680	7,274	7,623	6,159	16,113
District of Columbia	81	145	148	89	316	118	192	196	97	407
Maryland	8,738	28,162	29,935	19,962	56,862	9,677	33,153	35,378	20,297	63,127
West Virginia	1,892	8,334	9,043	8,833	18,759	2,406	16,917	17,003	8,882	23,905
Middle Atlantic	66,080	183,791	192,468	134,576	384,446	76,026	249,694	262,351	136,691	462,311
Virginia	19,988	76,833	80,809	58,436	153,957	30,821	91,151	98,659	59,610	181,582
North Carolina	53,574	152,057	163,550	120,291	326,922	101,270	165,185	175,271	127,366	391,791
South Carolina	25,482	67,497	72,474	48,681	141,660	60,691	81,693	87,405	58,964	201,248
Georgia	40,818	90,822	98,851	73,779	205,219	66,990	109,071	117,983	81,938	267,999
Florida	46,176	64,736	78,467	72,078	181,988	53,543	68,795	84,809	77,862	200,190
South Atlantic	186,037	450,444	493,551	373,165	1,008,646	313,215	515,865	562,007	405,730	1,232,810
Ohio	26,253	112,348	120,273	98,178	236,779	31,128	119,354	130,091	98,768	249,250
Indiana	24,092	104,420	111,630	104,151	232,663	37,126	111,607	131,877	106,060	254,793
Illinois	14,219	83,964	87,878	88,258	186,441	27,289	84,047	261,684	77,243	188,578
Michigan	12,102	62,491	66,477	52,612	127,208	15,685	66,812	74,018	63,123	137,620
Wisconsin	8,988	51,198	54,417	66,449	116,606	12,047	53,042	62,530	58,661	123,750
East North Central	85,624	384,421	410,675	369,648	859,693	123,275	436,862	660,200	393,855	953,992
Minnesota	8,107	29,030	30,326	21,826	58,663	7,312	41,371	44,319	21,670	70,353
Iowa	10,686	39,532	41,886	18,724	68,942	20,302	69,723	70,836	20,019	100,044
Missouri	16,993	54,995	59,450	34,907	105,295	29,536	68,821	114,312	38,105	136,462
North Dakota	401	2,989	3,067	1,020	4,410	573	4,383	4,544	1,038	6,994
South Dakota	289	772	877	68	1,129	821	1,713	1,901	82	2,416
Nebraska	1,656	3,879	4,018	231	5,765	11,824	8,299	8,749	324	20,447
Kansas	4,418	13,392	14,176	2,294	20,104	14,798	39,171	46,952	2,372	86,341
West North Central	38,549	144,589	153,499	78,770	261,908	84,966	223,481	290,613	83,610	392,067
Kentucky	14,665	45,514	49,918	32,660	92,839	23,629	66,707	79,160	34,784	125,120
Tennessee	14,600	39,101	42,544	32,359	86,060	28,122	60,609	68,639	37,841	126,272
Alabama	34,038	83,156	89,709	60,445	177,639	69,127	121,703	132,698	66,958	257,788
Mississippi	18,243	31,762	34,215	22,102	72,107	96,368	65,630	61,302	35,149	187,047
East South Central	81,546	199,533	216,386	147,566	428,645	217,246	304,549	338,799	174,432	696,227
Arkansas	10,776	21,587	23,162	23,596	58,959	40,611	32,832	38,093	33,961	107,404
Louisiana	9,671	18,661	19,961	12,618	40,980	38,319	28,226	32,468	16,649	83,194
Oklahoma	3,169	8,011	8,512	3,472	14,652	5,267	18,808	27,850	4,280	28,336
Texas	13,951	32,847	34,797	16,191	62,989	38,251	88,917	103,374	17,353	144,621
West South Central	37,667	81,106	86,452	55,877	174,580	122,448	168,783	198,785	72,223	363,454
Montana	216	479	530	23	718	2,018	5,328	5,732	26	7,372
Idaho	728	1,130	1,220	216	2,074	3,347	9,186	9,690	262	12,785
Wyoming	81	149	157	38	268	190	2,040	2,118	38	2,268
Colorado	1,830	3,863	3,996	1,035	6,718	6,760	11,060	11,329	1,159	18,969
New Mexico	186	210	220	39	406	2,367	5,188	5,302	104	7,649
Arizona	3,015	3,922	4,126	389	7,326	22,349	11,174	11,499	631	34,154
Utah	212	428	445	70	707	4,027	3,472	3,665	189	7,888
Nevada	19	36	37	9	65	20	250	275	9	279
Mountain	6,287	10,203	10,731	1,819	18,279	41,068	47,688	49,810	2,408	91,164
Washington	1,895	3,829	3,981	3,004	8,828	11,907	9,417	9,892	3,970	25,294
Oregon	1,942	3,666	3,819	2,128	7,726	17,285	13,540	14,166	3,107	33,932
California	22,646	22,626	24,043	11,780	56,900	142,063	66,270	69,202	18,170	226,503
Pacific	26,482	30,110	31,843	16,912	73,504	171,255	89,227	93,259	25,247	285,729
Continental U. S.	648,142	1,521,666	1,634,679	1,216,417	3,285,225	1,171,418	2,086,007	2,509,975	1,337,322	4,594,747
Hawaii	5,974	4,547	4,910	8,846	19,367	19,747	7,603	8,483	14,364	41,704
Puerto Rico	32,790	16,060	18,234	27,634	76,474	47,009	16,404	18,589	28,073	91,486
Alaska	10	19	19	11	40	60	113	115	45	218
Territories	38,774	20,626	23,163	36,491	95,881	66,816	24,120	27,187	42,472	133,408
Total: 1961-61	583,916	1,542,282	1,657,842	1,254,908	3,381,106	1,238,234	2,110,127	2,537,162	1,379,794	4,728,155
1960-61[4]	498,360	1,344,295	1,446,118	1,018,174	2,857,829	1,005,462	1,949,788	2,290,081	1,103,082	4,058,282
1948-49	512,474	1,384,669	1,500,040	999,035	2,896,178	919,946	1,941,709	2,289,631	1,073,073	3,934,728

1/ Includes Government distribution.

2/ Includes 2 percent of the colloidal phosphate and 3 percent of the phosphate rock marketed for direct application.

3/ Includes total phosphoric oxide in colloidal phosphate and phosphate rock marketed for direct application.

4/ Revised.

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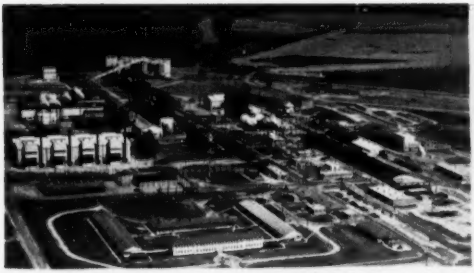

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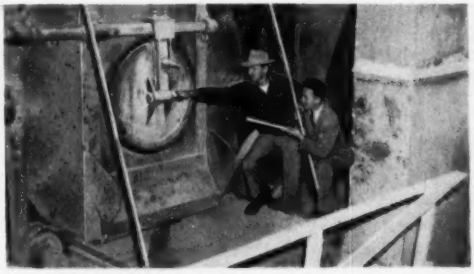

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Around the Map

CALIFORNIA

Best Fertilizers have purchased a 100 acre site near Stockton and plan construction of a $1,700,000 fertilizer plant, according to **Lowell W. Berry**, president. Organized in 1932, Best has plants now in Oakland and in Houston, Texas.

FLORIDA

Seaboard Air Line conducted its third annual Florida tour, bringing some 75 agriculturalists on a two day inspection trip, of which one day was devoted to the phosphate field. Visited were the plants of **International Minerals and Chemical** at Peace Valley and Noralyn; **Swift & Co's** Agricola plant; **American Agricultural Chemical's** operation at Pierce; **American Cyanamid** in Brewster; **Virginia-Carolina's** plant at Nichols.

* * *

Oak City Fertilizer Co., Bartow, has been sold to **James A. Dyer** and associates by former owner **James F. MacEnroe.** 10 people are employed by the plant which was established in 1924.

ILLINOIS

DeLand Phosphate Co. has been incorporated in DeLand. It has purchased the **DeLand Fertilizer Company** owned by **R. S. Dresbark and Ernest Harper**, and will sell and apply phosphate, lime and mixed fertilizers. Mr. Dresbark is president of the corporation. Mr. Harper is a director. Other officers, stockholders and directors include **Henry Tramblin, G. R. Madden, Henry Franklin, Lorin Swartz, Omer Trutney and Loren Clemons.**

* * *

International Minerals & Chemical, Chicago, through their Plant Food Division head, vice-president **Maurice H. Lockwood**, have announced four scholarships for high school seniors who are members of 4-H or FFA for the school term beginning this Fall. Each will grant $300, not renewable, and applications will be received from the areas served by International's 25 commercial fertilizer plants. Two scholarships each year, of $600 each, will be awarded to employees, or their sons or daughters, of the Division, renewable for a full four year course. These are in addition to the four which have been offered for several years past of $600 each.

* * *

Breese Grain Co., Breese, have completed their bulk raw phosphate plant, permitting loading from rail cars by elevator to an elevated tank which permits quick wagon loading. A second tank is to be constructed. **A. C. Koch**, president, says the plant was designed by **Baughman Equipment & Service Co.** of St. Louis. **John H. Huelsman** is the Breese vice-president.

IOWA

Simonsen Mill Rendering Plant, Quimby, are starting construction of a fertilizer building and are interested in equipment for mixing complete fertilizer. The operation is headed by seven **Simonsens: Dr. W. E., Alton P., Dr. E. Dean, Merle W. Dr. R. E., Dr. D. K. and Dr. Doyle W.**

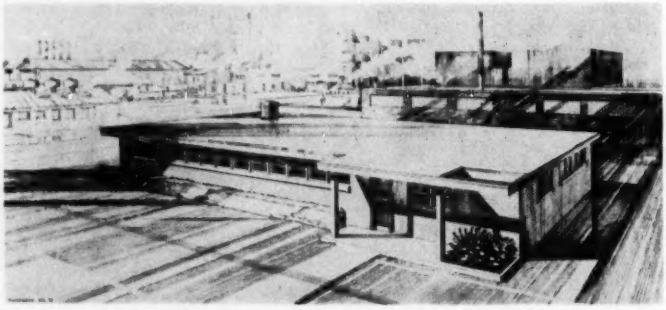
KENTUCKY

Cooperative Fertilizer Service, Richmond, Virginia, have plans to build a new fertilizer plant on a 15-acre tract near Louisville, approval for which was requested by **Zach P. Smith** field representative. The plans call for a 40,000 annual ton operation, with a plant 120 by 368 feet.

* * *

Ohio Valley Fertilizer Corp. Maysville, have completed their new plant, and are in production. **G. R. Nooe** is manager and co-owner.

The newly completed office building of Armour Fertilizer in Jacksonville.



14

MORE Fertilizer Plants Have Chosen D-K Cluster Hoppers

because

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Save Labor

Normal operation requires only 4 men—two men operating pay-loaders, one man operating swivel chute and one man weighing.

(2) D-K HOPPERS
Speed up Operation. Twice the material handled in half the time

(3) D-K HOPPERS
Increase capacity by 50%

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Also Manufacture Complete Line of Fertilizer Equipment

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ATLANTA, Ga.

LOUISIANA

Lion Oil's president, **T. M. Martin,** has announced public offering of stock which with sale of debentures will provide funds for the erection of the Barton Plant at Luling, 14 miles north of New Orleans. The plant is to have 300 tons daily capacity of anhydrous ammonia, the greater part of which will become prilled ammonimum nitrate. DPA has issued a five year amortization of 50%. The plant will cost $31,000,000.

* * *

Lake Charles Harbor and Terminal District. Lake Charles, have announced the construction of a nitrate shed which will increase port facilities some 25%. It will be 140 by 460 feet.

MAINE

Sagadahoc Fertilizer Co., Bowdonham, has a truck that hunts and kills deer. At least, it did back in April. Driven by **Lynde Heath,** the truck hit a 200 pound doe, turned over and killed the doe. Heath was not injured, just surprised. Aside from the doe the chief casualty was six tons of fertilizer, spread alongside the road.

MARYLAND

Mathieson Chemical's plant at Curtis Bay has worked more than a million man hours without a lost time accident. **Baltimore Safety Council** has awarded them a Merit Award. Vice-president **R. B. Worthy** accepted it for plant manager **Henry A. Koehler** and the plant safety committee.

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Wm. B. Tilghman Co., Salisbury, publish "The Tiller," an organ from which we quote quite often. The current issue introduces "liquid fertilizers" to the area they serve, and very sensibly points out that nitrogen solution has been long used in fertilizer plants for mixing in their regular grades. They show a picture of an applicator they call "Nitro-Shooter" for application of anhydrous ammonia and nitrogen solutions.

MISSISSIPPI

Spencer Chemical expect their $15,000,000 plant at Vicksburg to be in production a year from now, and that it will make them the largest producer of anhydrous ammonia in the country. The plant will produce 200 tons daily, by a process expected to reduce the cost about 6% because of the new, highly efficient oxygen-nitrogen generator designed and fabricated by **Air Products, Inc.,** Allentown, Pennsylvania.

This generator, built at a cost of more than a million dollars, will extract daily from the air 180 tons of oxygen of 98% purity and 310 tons of nitrogen of nearly 100% purity. Natural gas, water and air are the only raw materials used. The process represents the first commercial synthesis of ammonia using oxygen for partial oxidation.

MISSOURI

Monsanto, St. Louis, is subjecting Krilium, to one of the most ex-

Soluble plant-nutrient chemicals by Monsanto are being formulated into fertilizer solutions, providing direct feeding to plants of nitrogen, phosphorus and potassium without harm to leaf crops. Immediate solubility, when applied directly to plants, is a characteristic of solutions of Di Ammonium Phosphate, Mono Ammonium Phosphate, Mono Potassium Phosphate and Phosphoric Acid 75%. They also are available for dry applications.

Shipped in appropriate containers, these chemicals are being used by fertilizer manufacturers in processing specific formulations for soil dressing or direct-to-plant applications. Standard farm equipment is used for either spray or solid application. For information concerning this available supply of plant-nutrient chemicals, contact any District Sales Office, or write MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700-C South Second Street, St. Louis 4, Mo.

☆ ☆ ☆ ☆

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto Canada Limited, Montreal.

MONSANTO PLANT NUTRIENT CHEMICALS			
	N	P_2O_5	K_2O
Mono Potassium Phosphate (Crystals)	—0—	51.6%	34.2%
Di Ammonium Phosphate (Crystals)	21.0%	53.85%	—0—
Mono Ammonium Phosphate (Crystals)	12.2%	61.61%	—0—
Phosphoric Acid (75.0%) (Liquid)	—0—	54.5%	—0—

MONSANTO
CHEMICALS — PLASTICS

SERVING INDUSTRY... WHICH SERVES MANKIND

tensive testing programs in history. 100 technical cooperators in 48 states, more than 30 of the largest universities, and 20 large commercial organizations are testing the conditioner. State highway departments in 32 States are evaluating erosion performance, and 25 leading academic soil scientists are making specialized studies.

At the home base they have bought 257 acres for more than $100,000 to use as a test ground for Krilium and other farm chemicals. No manufacturing will be done on this site, though there may be laboratory facilities erected there.

The product was put on the market by mail in mid May, an improved variety called "Merloam" being offered the public in large new paper advertising.

Monsanto announced May 15 that it has increased its production capacity for phosphoric acid, ammonium phosphates and potassium phosphates for use in formulating liquid and water soluble fertilizers. **W. R. Corey,** manager of phosphate and detergent sales for the Phosphate Division, made the announcement.

* * *

Thurston Chemical Company, says President **William R. Thurston,** is planning a $2,500,000 expansion program in the Joplin area, which will call for 24-hour operation and the addition of 30 to 40 additional personnel. **Chemical Construction Company** has been called in to aid in completion of the planning.

Processes developed by **TVA,** which Mr. Thurston believes have not been applied to agricultural service in any other part of the nation, will enable the farmers of Thurston's area to benefit by the newer formulations recommended by USDA, according to the announcement.

The statement points out the strategic location of Joplin as to supplies of raw material. Ample supplies of sulphuric and nitric acid, required in the new processes, are available to Thurston. Some fabrication materials required for plant construction are in short supply, but Mr. Thurston anticipates no great delay in erection of the plants.

The present plant at Atlas will be used in conjunction with the new installations, which taken in combination will permit a 50% increase in total output of plant food.

Thurston only recently signed contracts for a plant at Trenton, which will become an outlet for new products produced in Joplin. And now that the new manufacturing plant plans are completed, additional plans will be undertaken to enlarge and improve present facilities, and to investigate other new processes.

The company operates in Missouri, Kansas, Oklahoma, Arkansas, Iowa, Minnesota and Nebraska.

NEW YORK

Commercial Solvents Corporation has moved its offices to 260 Madison Avenue, New York 16. The new phone number is LExington 2-6420.

* * *

W. R. Grace & Co. are planning a $20,000,000 ammonia-urea plant, to be erected in the very near future "in the U.S. Middle West" as President J. Peter Grace, Jr. puts it. The plant will have a daily 250 ton capacity, producing ammonia from natural gas and converting part of the ammonia to urea. Grace has a century of experience in fertilizer. Their subsidiary **Naco,** with plants in the Carolinas, Florida, Ohio and California, is a large nitrogen consumer.

* * *

Fertilizer Corporation of America has filed with the New York Secretary of State. Directors: Mollie Singergman, Frances Keane and Rosalyn Weinberg, all of 295 Madison Avenue, New York City.

NEBRASKA

Allied Chemical & Dye has announced plans to build a $25,000,000 plant near La Platte, 15 miles south of Omaha, to produce urea and other nitrogen fertilizer materials. Construction is contingent on approval by the Federal Power Commission of the application of Northern Natural Gas for authority to install natural gas facilities into the proposed plant. If the authority is granted promptly, construction should be completed late next year. Allied designed and built the first successful commercial synthetic ammonia plant in the US. in 1921 at Syracuse, N. Y. and their plant at Hopewell, Virginia, which followed in 1927 has been called "one of the greatest US chemical achievements."

OHIO

Ferro Corporation, Cleveland, has fused trace elements into a product they call "porcelain fertilizer" which is now being sold to commercial fertilizer mixers. Because it is fused, the product dissolves slowly and they claim it releases the minor elements at the proper rate for plant utilization.

* * *

Nitrogen Farm Service, Milford Center, has been organized to offer anhydrous ammonia to that section. It is headed by **George Thiergartner, Robert Strausbaugh, John Wible and William Ryan.**

TEXAS

Freeport Sulphur is spending $150,000 on UHF radio telephones to keep contact between marshland domes, boats and barges. Four transmitter stations, augmented by four relay stations will operate on six channels approved by FCC.

* * *

Campbell Fertilizer Co., Houston, suffered a $12,000 fire loss which burned the center section of their 2-story structural steel building, destroying 3000 paper bags, bagging machinery, conveyors and 500 filled bags of fertilizer. **B. L. Henderson,** president, reports 90% of the loss was covered by insurance.

* * *

American Farm Chemical Co., Fort Worth, is cooperating with students in agricultural schools in demonstrations of the value of liquid fertilizer. Bigrow is their brand.

Swift & Company's plant-food division has received from National Production Authority in Washington an O. K. on a proposal to construct a fertilizer plant at Houston to cost about $460,000. The permit involves the construction of a building 300 feet long by 180 feet in width of corrugated exterior on a steel frame.

* * *

The Bactex Company, San Antonio announces the appointment of the **Fertichem Company** of Dallas as distributor of Bactex organic and mineral fertilizers in the Dallas-Fort Worth area. The Fertichem Company is owned by **Garrett Sherman.**

Leon Tobais, owner of the Dallas branch of Bactex announced Fertichem's appointment.

AUSTRALIA

Brimstone shortages are bringing more attention to sulphide minerals of which large bodies are found in West Australia, as well as pyrites. **Norseman Gold Mines** is now the principal source of pyrites for this purpose. **Big Bell Co.,** also a gold mine, could provide sulphur for fertilizer if gold-mining became less profitable, as could the so-called "Golden Mile" the gold center near Kaloorlie.

South Australia has a large pyrite occurrence at Nairn, in which Australia's great steel concern, **Broken Hill,** is interested. **Mt Lyell** and **Norseman** both aim at increased output as transportation facilities permit.

CANADA

Toronto's Board of Control is considering the sale of treated sewage sludge. "Tororganite" is a name that has been suggested.

CHILE

Although no organized move against landowners is under way, the number of farms in Chile is increasing and area per holding is declining as medium-size farms are broken up into smaller. The Center and Leftist parties both have included a land reform plank in their platforms, but no action has been taken.

ENGLAND

Thomas Hedley & Co. (Procter & Gamble) and **Peter Spence & Sons** have joined hands in the formation of a new company in Widnes for the production of sulphuric acid. The concern is known as **Widnes Oleum Co.**

FRANCE

The North African territories of France are expected to yield a million more tons of phosphate in 1952, a total of 8 million. The production will come from Tunisia, and Senegal.

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Chambre Syndicale National des Fabricants D'Engrais Composes have sent us a volume entirely in French, beautifully done as to typography and illustration, which is a report of production by its members. Two hundred and twenty six manufacturers and more than three hundred and fifty plants supply the 1,500,000 tons which the nation's farms require, shipping over a 9-month period. 20% goes by truck; the remainder by rail. Granulated fertilizer is offered, the industry holding no brief for granulated as opposed to the more common forms. 10-10-10 represents 121,195 tons. 5-10-10 represents 66,250 tons out of a total of 553,150 tons produced by the larger plants—which make 20 formulas.

NETHERLANDS

Central Stikstof Verkoopkantoor N. V., The Hague, which is the central sales organization for all Netherlands nitrogen manufacture has also put out a beautiful printed report on agriculture in that land, with particular emphasis, of course, on the nitrogenous fertilizer industry and the use of nitrogenous fertilizers. Since 1922-23 the total consumption of pure nitrogen has risen from 25,200 tons to 165,000 tons. The industry consists of three large producers, three smaller, and various municipal gas works. When all projected expansions have been completed, the aggregate productive capacity will be 250,000 annual tons of N.

NEW ZEALAND

Three agricultural representatives of New Zealand are in the US studying the TVA calcium magnesium phosphate process as a possible answer to their problem of 600,000 tons too little superphosphate. They are: **L. J. Stevens,** chairman of the **Fertilizer Manufacturing Association; N. W. Perry,** president of the **Federated Farmers of New Zealand; E. J. Fawcett,** director general of the **New Zealand Department of Agriculture.**

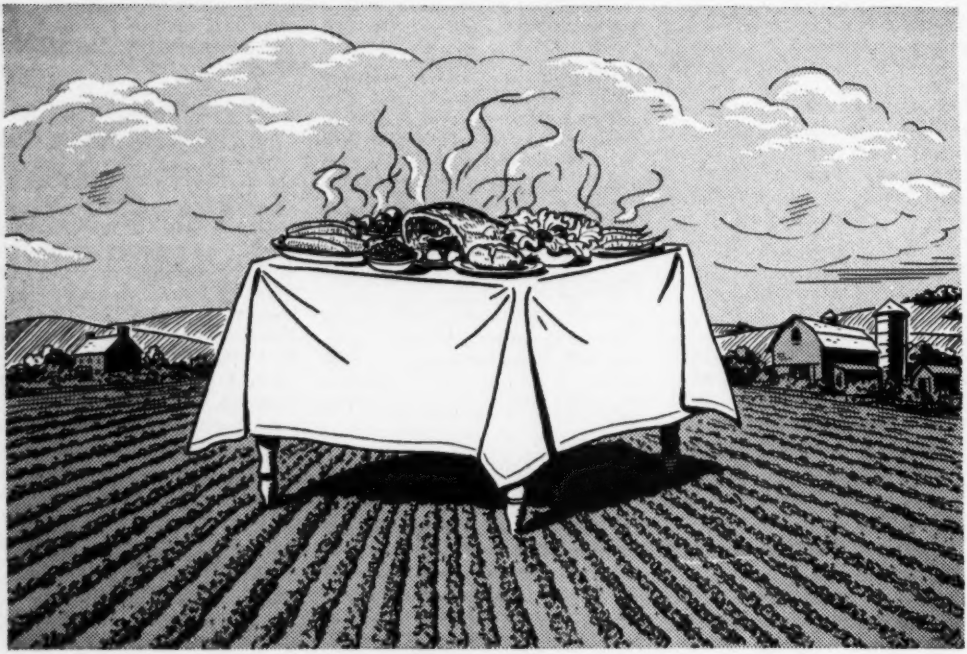
Friends Of Land To Convene June 30

The eleventh annual institute of Friends of the Land will convene Monday June 30-July 2 at the Medical Center, University of Illinois and the Conrad Hilton Hotel, Chicago. The objective is to bring together eminent scientists for a popular summary of recent advances in fields relating to the health of plants and animals . . . and of course, people.

A distinguished list of speakers in the field of agronomy, is balanced by a group of distinguished medical men. Among those familiar to our own industry are: Emil Truog, Wisconsin; K. Starr Chester, Battelle Institute; Richard A. Carrigan, Armour Institute; C. E. Marshall, Missouri; Folke Skoog, Wisconsin; Perry R. Stout, California; Lloyd Harrold, USDA; A. D. Stoesz, USDA; Louis Bromfield, Farmer-Author; Vincent Sauchelli, Davison Chemical.

Alabama Conference

Alabama AES is sponsoring June 3 a conference and tour of the Black Belt and Lower Coastal Plain substations for fertilizer people. Supply and use problems of vital importance to the industry will be discussed. The field experiments will show research problems leading to fertilizer recommendations.



The Biggest Table in the World

IT cannot be measured, or weighed, or fully appraised, yet it is the largest on earth . . . The American Table. The largest, and certainly the most envied . . . for mouths the world over water at the mention of the food it serves in such variety, quality and abundance.

Abundance? Today, yes. But, tomorrow? The question can be answered only by the four great correlatives—*farmers, science, fertilization, soil conservation.* It cannot be answered by "more acreage", because "more acreage" does not exist. There are more mouths to feed each year, and less acres per person.

For years the Synthetic Nitrogen Products Corporation has been stressing the urgency of *increasing* fertilization to compensate for a *diminishing* acreage, and the need for greater yields per acre through the use of more fertilizer as the only way to maintain abundance, or even sufficiency.

SYNTHETIC NITROGEN PRODUCTS CORPORATION
285 Madison Avenue, New York 17, N. Y.

CAL-NITRO* TRADE MARK REG. U.S. PAT. OFF.
The Nitrogen Topdresser

SNP

POTASH
Muriate — 50% and 60% K_2O
Sulphate — 90-95% K_2SO_4

*The Synthetic Nitrogen Products Corporation owns the trade-mark "Cal-Nitro", which is used to designate a nitrogen fertilizer compound.

In the Field of

ALLIED FARM CHEMICALS

Piper Cub doing a job of dusting.

NAC ANALYZES 1950-1951 PESTICIDE PRODUCTION

Nearly 300 million pounds of chlorinated hydrocarbon insecticides were produced from October 1, 1950 through September 30, 1951. This represents almost one-fourth of the 1,229,278,000 pounds total output of technical pesticidal chemicals during that period. Sulfur production accounted for over one third of the total amount of pesticides produced during the year.

There are many problems involved in releasing production figures. Some products are manufactured by one or two companies, only, and statistics are not available. A reporting service for pesticides is difficult to maintain, for in many instances, the end use of the product is not always known. Some of these chemicals may be used for more than one purpose.

The adoption of the production year beginning October 1 and ending September 30 is not a haphazard choice, but one based on activities in the pesticides industry and the use of finished products by farmers. The bulk of production occurs from October 1 through April 30 of each year and the peak use period is from April 1 to July 31. A year established on the basis of production and use gives a better picture of what is actually taking place from manufacturer to user. Federal agencies have adopted this production-use period and are collecting production figures on that basis.

The accompanying table was compiled from information obtained from the National Production Authority and the U. S. Departments of Agriculture and Commerce and rounded off and estimates made where insufficent data was available. The figures include imports of products such as rotenone-bearing materials and production intended for domestic and foreign markets.

This table does not include diluents such as talc, diatomaecious earth, petroleum oils, nor benzene and xylene used to formulate the basic materials. The active ingredients often represent only a meagre part of a finished pesticide. The inclusion of diluents, wetting agents and emulsifiers into the total production figure could add at least another half billion pounds to the output. The inclusion of rodenticides and wood preservatives would increase, substantially, the total production figure, also.

The total of 1,229,278,000 lbs. of basic pesticidal chemicals produced during the year, at a conservative and arbitrary figure of 20 cents per pound across the board, had a value of $245,855,600.00

Production of Pesticides
Oct. 1, '50—Sept. 30, '51

CHEMICAL	POUNDS
Insecticides	
Calcium Arsenate	47,866,000
Lead Arsenate	33,440,000
Cryolite	3,000,000
Rotenone (Imports)	8,010,000
Nicotine	1,000,000
Pyrethrum	7,074,000
DDT	91,320,000
BHC	99,647,000
Other Chlorinated Hydrocarbons	91,000,000*
Dinitros (Dormant)	2,500,000
Phosphates	7,610,000
Oils (Dormant)	86,792,000*
Fumigants	28,377,000
Total	507,636,000
Fungicides	
Sulfur	483,000,000
Copper Sulfate	102,642,000
Dithiocarbamates	12,000,000*
Others	2,000,000*
Total	599,642,000
Weed Killers—Defoliants	
Sodium Arsenite	5,500,000
Sodium Chlorate	35,000,000
2,4-D Acid	20,000,000
2,4,5-T	2,500,000
Others	59,000,000
Total	122,000,000
Grand Total	1,229,278,000

***Estimated**

A tabulation of the domestic consumption of pesticides as reported by the Production and Marketing Administration indicates that our domestic use plus our exports add up to a figure which compares closely to production. Based on total output, this indicates a close correlation

of production and use across the board from one season to the next.

With an expected nine per cent increase in domestic consumption plus increased export quota, there will necessarily be expansion in the pesticides industry if goals are to be met.

Greatest increased production is expected to be among the newer organic materials such as the clorinated hydrocarbons, phosphates and "hormone-type" weed killers. Production of older types of products such as arsenicals, rotenone, cryolite and pyrethrum is expected to about equal last year's figures.

In a long range view, production of the weed killers, defoliants and wood preservatives should increase proportionately as new products and mechanization increase. It is not out of reason to expect this latter-group of materials to equal the production of insecticides or fungicides.

Cal-Spray Opens New Texas Plant

Carl L. Elliott, branch manager at Brownfield, Texas announces the establishment of a California Spray-Chemical Corporation dusting-blending plant in that city which is 42 miles west of Lubbock. The South Plains which now holds the world's record in cotton production and last year achieved first place in the production of cottonseed oil with the erection of a new plant in Lubbock —the largest in the world—has made necessary increased insecticide facilities for cotton farmers in this area.

Cotton insecticides will be manufactured in the dust-blending plant and liquid insecticides not to be manufactured locally will be stocked in the new plant. Elliott states that technical difficiulties interfere with the production of liquid insecticides in branch plants such as the one going up in Brownfield.

Other branch plants of the corporation, a subsidiary of Standard Oil Co. of California, in Texas are Greenville, Uvalde and Wharton. Tentative plans call for erection of a plant at Harlingen in the fabulous Rio Grande Valley.

Shell Chemical Purchases Julius Hyman

Shell Chemical Corporation has completed arrangements to purchase the stock of Julius Hyman & Company of Denver, Colorado, and has concluded an agreement with the Velsicol Corporation of Chicago for exclusive rights world-wide, to aldrin and dieldrin, important agricultural insecticides, it was announced by Jan Oostermeyer, president.

Shell Chemical has marketed aldrin and dieldrin ever since their commercial introduction in 1950, at which time they were manufactured by Julius Hyman & Company. On March 17, 1952, however, following lengthy litigation, a court order granted patent rights on the insecticides to Velsicol Corporation.

Julius Hyman & Company will continue to operate under its present name.

PAC Announces Systox Insecticide

Pittsburgh Agricultural Chemical Company, a division of Pittsburgh Coke & Chemical Company, in cooperation with their associate, the Chemagro Association, has been researching for the past three years an organic insecticide known as Systox. This new chemical compound is the first true systemic insecticide to be approved for use in this country. Systox, originally developed by Dr. Gerhard Schrader of Farbenfabriken Bayer, Germany, has been found particularly effective for the control of such sucking insects as aphids and mites and is readily translocated in most of the agricultural crops such as fruits, vegetables, forage crops, ornamentals, tobacco, and cotton. This season the material will be available commercially for the control of aphid and two-spotted mite on cotton.

Pesticide Test Grants In Aid

An expanded grant-in-aid program designed to test new agricultural chemicals on a wide variety of crops under varying climatic and soil conditions has been announced by Columbia-Southern Chemical Corporation.

Grants-in-aid will be extended this year to more than thirty universities geographically spread across the nation. During 1951, the chemical company inaugurated its grant-in-aid program at nine different universities, according to E. T. Asplundh, president.

Wash. Pennsalt Announces New Malathon Insecticide

"Penthon", a new organic-phosphate type insecticide specially designed for protection of apples and pears and certain other crops, has been formulated for commercial use by the Pennsylvania Salt Manufacturing Company of Washington.

Containing malthon (compound 4049) as the active insecticidal chemical, "Penthon" provides effective control in conjunction with greatly reduced toxicity to man, compared with certain other organic phosphate pesticides. It has also been tested extensively as a spray and in an aerosol on ornamental plants, out-of-doors and under glass, and shows exceptionally good plant tolerance to a wide variety of plants.

Powell Opens Paris Office

Mr. William Pollert, Vice President of John Powell & Co., Inc. announces the opening of a Paris office at 56 Rue de Bassano, Paris 8, France, which will become the European headquarters of Powell's overseas affiliate, John Powell International, Inc.

The new office will be under the management of Mr. Claude Houries, who has represented Powell in North Africa for the last several years.

Hi-Yield Makes Insecticides

Hi-Yield Chemical Company, Bonham, Texas, early last month began production of insecticides. They operate fertilizer plants in the area. Harold Baker manages the Bonham plant.

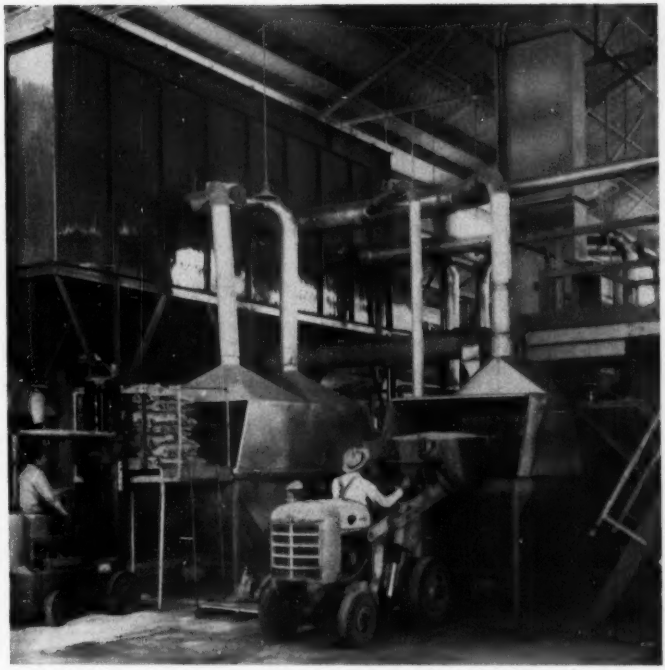
Sunland Industries Defeats Dust And Recovers Fertilizer

By controlling dust at its source, through specially designed hooding and piping which conveys the otherwise dispersed material to a modern dust collector, Sunland Industries, Inc., at Fresno, California, has achieved excellent housekeeping and clean operations in the production of mixed fertilizer.

At the same time they are recovering 20 cu. ft. of salable fertilizer every 40 hour week. Working conditions are excellent, with the result that production efficiency is high.

When this plant was in the construction stage Sunland consulted with engineers of American Wheelabrator & Equipment Corporation, 1081 S. Byrkit Street, Mishawaka, Indiana and a complete ventilating system using an American Dustube Collector was designed to do a thorough job.

Open hoods were designed to ventilate the batching bins, weighing hoppers, and bagging machines directly to the dust collector, but the screens, mixers, and hammer mills operate in a closed system and are ventilated through the elevators. The dust collecting unit is equipped with approximately 5,900 sq. ft. of cloth, filtering 19,500 cu. ft. of air per minute which is sufficient to ventilate all operations adequately. The cloth is in the form of cotton sateen tubes, 5" in diameter and 90" long. At predetermined intervals, these tubes are mechanically shaken to remove the dust lodged in them. The dust then falls into the hopper, from where it is removed and returned to the manufacturing processes. Operating and maintenance costs are surprisingly low.



Sunland's Dust Control Set-up

Hercules Builds Biological Lab

Plans are being drafted by the engineering department of Hercules Powder Company for a new biological laboratory which will be constructed at their Experiment Station near Wilmington, Delaware. The new structure will enable the company to expand considerably its work in biological, botanical and agricultural fields.

Construction will begin in September and it is expected that the lab will be ready for occupancy by April. A main laboratory and two greenhouses are to be built. The buildings will cost around $400,000 Dr. E. N. Woodbury, chief entomologist will head the work of the laboratory.

Toxaphene is one of the best known of the products which have come from Hercules research.

Pillsbury Patents Wheat Protectant Method

Pillsbury Mills, flour millers, Minneapolis, have developed and patented the use of pulverized wheat fractions as a diluent or carrier for powered insecticides. They began investigations of the material for this purpose several years ago and filed patent application in 1949, involving the use of Pyrenone and piperonyl butoxide, patented products of U.S. Industrial Chemicals division of National Distillers—to which company Pillsbury has granted exclusive license under the patent. USI plans to step up production of Pyrenone Wheat Protectant to meet anticipated demands for the protection of the 1952 wheat crop.

Wheat offered a special problem because regulations demanded a protectant which would have no adverse effect on the appearance or the feel of the wheat. The new product is easily applied and easily removed by normal cleaning methods. It is recommended as a protectant, and not for use in badly weevil infested wheat.

Use by wheat farmers, Pillsbury states, would save up to 25% of the wheat crop. It is effective for at least one storage season.

Pyrenone Grain Protectant, a companion products, uses a mineral-type carrier and has been successfully used on corn, rice, barley and other grains and seeds.

Personals

Harry Amenta, International Fertilizer & Feed Company, Bakersfield, California, is the man who suggested, via Commercial Fertilizer's pages back in 1946 that the amazing growth of vegetation in Japan's atom-bombed cities deserved investigation. It was, and the report was negative.

Mr. Amenta has become president of the Rudnick Enterprises, with the retirement of **Oscar Rudnick,** who began in Bakersfield in the cattle business, and expanded to many enterprises related to agriculture. International Fertilizer was created when the two men bought the premises of a fire-destroyed dehydrating plant in 1942 and built the fertilizer plant there.

The Rudnick Enterprises have just acquired their first canning plant, packing citrus juices and frozen concentrates, to add to the array, which includes meat packing plants, cattle feed lots, ranches in three states, grain elevators, cotton gins, cottonseed oil mill, warehouses, dehydrators, alfalfa mills and other interests.

Mr. Amenta was Chief of the Dehydrated food Section, WPB during World War II, left that service to manage the plant which burned down, and on the ashes of which the International plant was built.

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James H. Zwemer will this month join **Smith-Douglass Company,** Norfolk, Virginia, as manager of research and development, in overall charge of production at all of their plants. He has been with Monsanto since 1942.

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H. W. Horton has been transferred by **Swift & Co.** from their phosphate operations at Bartow, Florida, to be Division Auditor at New Orleans

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George T. Collins has been made assistant to the president of **Pennsalt.**

* * *

G. B. Meredith has been made assistant to vice-president **Dr. M. F. Folger,** who is in charge of **Solvay's** nitrogen plants. He has been with them since 1927, and was Chief Chemist of the Solvay process Division's South Point, Ohio, nitrogen products plant.

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H. E. Dennie has been moved from sales representative out of Chicago to be sales manager of the Philadelphia branch for **Chase Bag Company. E. S. Elgin** has been moved from Philadelphia to Chicago, where he will direct sales and production of various products, including the all-crinkled multiwall bag. **Walter J. Wilks** has become manager of their Chagrin Falls, Ohio plant.

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Frank P. Scar will head the fertilizer and feed department of **L. Pasternak,** New York. He was formerly vice-president of **Synthetic Nitrogen Products Corp.,** and president of **Scar-Lipman.**

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William S. Fraser has joined the research staff of **Calumet and Hecla Consolidated Cooper Co.,** Calumet, Michigan, as supervisor of agricultural research.

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Walter J. Thomas has become comptroller of **J. M. Tull Metal and Supply Co.,** Atlanta, Georgia. He had been with Dun & Bradstreet for 14 years.

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Richard F. Strawn vice-president in charge of sales for **Howe Scale,** Rutland, Vermont, announces the appointment of these new branch managers:

Fremont Fisher, formerly Philadelphia branch manager, becomes manager of the Chicago Branch. **Manuel J. Kauffman,** formerly salesman at Philadelphia is promoted as its manager. **John R. Berry,** formerly salesman at Houston becomes manager of the Denver branch. **Charles J. Koch,** becomes New Or-

Robert C. Simms, who has been made vice-president and director of Thurston Chemical Company, Joplin, Missouri. He joined them in 1951 as assistant to the president, after 24 years with Naco, resigning as president.

Left, Sydney T. Ellis who has been named a vice-president of Commercial Solvents Corporation. He will continue to serve as assistant to President J. Albert Woods, his function for the past year. Right, Robert E. Hays, whose appointment as District Sales Manager for the Agricultural Chemicals Division was reported in "Personals" last month.

leans branch manager, succeeding **Clinton C. Romig** who has retired after theirty years of service. **O. B. Phillips,** formerly salesman at Seattle, is promoted to manager, succeeding the late **Albert N. Lyons.**

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Richard C. Wood has been made assistant to **Abbot K. Hamilton,** vice-president in charge of product divisions of **Commercial Solvents.** He has held executive and development posts in the chemicals industry for the past 16 years.

* * *

Edward T. Casey, who has been on the sales staff of **Irving R. Boody & Co.** and **Wessel & Duval** has now joined **H. J. Baker & Bro.,** New York 102 year old importers and exporters.

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S. O. Hutcheson, Jr., assistant credit manager for **Armour** in Jacksonville has retired after 35 years of service with them.

F. H. Ludington, president, and key personnel of the Riedsville branch of **Chase Bag Co.** were guests of honor at a banquet staged by the Chamber of Commerce of Reidsville, N. C. The banquet was to express the community's appreciation for the bag concern's contributions to the growth of the city.

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P. C. McGrath has been made assistant manager at St. Louis by **Bemis Bro. Bag Co., A. N. Weeks,** manager of the East Pepperell, Mass, plant, and **R. J. Williams** of the St. Louis engineering department, have returned from a European paper bag plant inspection tour. **R. W. Lahey, Jr.** has been given the newly created post of Textile and Paper Bag Specialist at the Norfolk plant.

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A. T. Kennedy, president Davidson-Kennedy Co., Atlanta has been appointed to the international relations committee of the National Association of Manufacturers.

OBITUARIES

Martha L. Braum, for 18 years a secretary for Armour Fertilizer works executives, May 13, in an Atlanta, Georgia, hospital.

Clyde C. Craven, 62, industrial chemist with the Wyandotte Chemical corporation for 28 years, died May 14 following a heart attack at his home.

Henry A. Huschke, 51, agronomist with OPS, as he had been with OPA in a previous emergency, May 4 of a heart ailment.

John M. Ware, 46, chemical engineer for Buckeye Cotton Oil Co., Atlanta, Georgia, May 16 at his home.

This freshly planted field demonstrates the way contour planting is practiced on Dole Hawaiian Pineapple Co.'s plantations. Fields are planted in wide graceful terraced rows, allowing the tropical rains to "walk off" rather than "run off" the fields, thereby preventing erosion of valuable top soil.

—Dole photo.

PC&F HELPS BUILD HAWAII WITH

By JOHN D. RAMSEY

Sugar and pineapple to people in Hawaii mean the life's blood of the islands' economy. Sugar and pineapple as the first and second industries of Hawaii call for some of of the most methodical, most scientific use of commercial fertilizers, insecticides and weed killers known to the nation.

By far the largest supplier of those fertilizers and sprays is the Pacific Chemical & Fertilizer Co. with headquarters at its ten acre plant in Honolulu.

Sixty-one years ago, men at PC&F started servicing sugar and pineapple, and their company has grown with those industries in both physical scope and technical knowledge.

Besides 28 sugar plantations and seven pinapple companies, Hawaii has coffee growers and truck gardeners who must be served. People who grow exotic flowers for Hawaii's fast-growing export market need their share of fertilizer.

These demands of an agricultural economy mean that PC&F must keep manufacturing, importing and experimenting with new processes to keep pace with industry.

Today, PC&F has 260 employees in its home plant and in branches on all of Hawaii's major islands. Those employees represent many national extractions. There are Caucasians (called "haoles" in Hawaii), men of Japanese ancestry, Chinese, Filipinos, Puerto Ricans, Portuguese and part-Hawaiians.

R. Q. Smith is president of Pacific Chemical & Fertilizer Co. and general manager of its operations.

R. Q. Smith is president and general manager of the firm and is assisted by W. G. Hewitt, vice president and assistant general manager, and G. B. Hayes, vice president and treasurer. Walter J. L. Wilson, general superintendent keeps operations running smoothly at each of the plants.

E. L. Harker manages the plant at Hilo on the Island of Hawaii, while G. F. Carr heads operations at Kahului, Maui and Douglas Baldwin is in charge at Puhi, Kauai.

The island of Hawaii—the "Big Island"—boasts thirteen of the territory's sugar plantations. Sugar is the big item on Oahu, Maui and Kauai, too, but those islands have bigger plantings of pineapple than does Hawaii.

Raw materials for all fertilizers except superphosphate are shipped directly to Hawaii, Maui and Kauai ports. There they are mixed into the fertilizers required for each plantation. Plantations use either their own trucks or those of commercial carriers to haul the fertilizer from PC&F warehouses to their fields.

The Honolulu plant manufactures fertilizers for use on its own island of Oahu and arranges for transshipment to the island of Lanai, where the Hawaiian Pineapple Co., Ltd., has 16,000 acres planted to pineapple, and to Molokai, the island where Libby McNeill & Libby and the California Packing Corp. have large plantings of pineapple.

The Honolulu headquarters also either makes or imports chemicals for use on all islands. Researchers at PC&F are continually seeking better ways to produce the fertilizer mixes and to improve the physical condition of those mixes.

In manufacturing, one of the basic

Solid or liquid fertilizer is applied mechanically near the base of pineapple plants in the fields of the Hawaiian Pineapple Co., Ltd. Nitrogen is the most commonly replaced element, but potassium and phosphorus may also be required.—Dole photo.

FERTILIZER AND INSECTICIDES

materials men at PC&F must have is sulphuric acid. The company is operating a new manufacturing plant designed by the Chemical Construction Corp. of New York. The plant produces the equivalent of 25 tons of 100 per cent sulphuric acid a day.

The acid is drawn from the huge storage tanks to help make the several metal sulphates required by Hawaiian agriculture. The metal is principally scrap material, a by-product of the operations of the American Can Co. and various other factories in and about Honolulu.

Shipments of sugar and pineapple to the mainland must bring in the money to buy mainland products needed in Hawaii. In recent years, Hawaii has spent more on the mainland than she has received for sales of the two main commodities. By using locally procured scrap material for the manufacture of iron and zinc sulphate, PC&F is helping in the attempt to keep Hawaiian economy balanced.

Sulphuric acid is also used by the pineapple companies in an ion exchange process that clarifies pineapple juice and reclaims natural sugar. That process creates an additional market for PC&F's product. One of the largest users is the Hawaiian Pineapple Co.

PC&F built its first sulphuric acid plant back in 1890 to acidulate a low grade phosphate rock found on Laysan Island, located about 800 miles from Honolulu. The Chemico contact plant is the third acid plant constructed for PC&F.

Superphosphate continues to be a big user of acid although ammonium phosphate has replaced some of the superphosphate used in the islands. Much of PC&F's phosphate rock comes from Maketea, an island some 2,000 miles south of Hawaii. Tramp steamers bring the rock in bulk. Smaller shipments of phosphate rock come from Florida, Idaho and Wyoming. PC&F uses a Bradley pulverizer and a Sturtevant mixing unit in making superphosphate.

For sixty years, PC&F has manufactured and packaged fertilizer under its brand name of Gaviota. Gaviota is the Spanish name for seagull, one of the birds that produced the guano imported years ago for use as fertilizer.

PC&F bags garden, lawn, rose and anthurium fertilizer under the Gaviota label. It is using a new Triangle machine in the packaging operation. The company also makes orchid fertilizer. In Hawaii, where orchid fanciers maintain greenhouses at their homes and where others raise the flowers for export, this fertilizer is an important item. Orchid fertilizer is a completely soluble fertilizer containing copper, zinc, iron, calcium, magnesium, boron, manganese and vitamin B-1.

Pacific Chemical & Fertilizer's main plant lies in the principal industrial area of Honolulu. PC&F's nearness to main highways and the waterfront gives it ready access to both customers and incoming supplies. The company has branches on all major islands to serve agricultural needs there.

Photographs taken as Southern California members of the California Fertilizer Association went on field trips after the meeting held in Bakersfield, April 24.

On the chemical side, PC&F manufactures battery acid for both civilian and military consumption. PC&F imports parathion, 2,4-D weed killer, and numerous other chemicals used to combat the plant and animal enemies of sugar cane, pineapple and truck vegetables. It has a small insecticide dust mixing plant where it formulates for the local market.

When it comes to nitrogenous fertilizers, PC&F finds it more economical to import than to manufacture. For years PC&F has imported ammonium nitrate in yearly quantities running well into five figures. Sugar and pineapple producers have found this fertilizer most economical both alone and in mixtures because of its high nitrogen content.

But last year, the coast guard made it more practical to bring nonexplosive fertilizers with lower nitrogen content into ports with the necessary facilities until regulations can be changed. To make up for the ammonium nitrate it no longer imports, PC&F now brings in a proportionately greater amount of ammonium sulphate.

The company imports urea from the U.S. mainland, England, Norway and Japan. It brings in ammonium phosphate and sulphate of ammonia from Canada, potassium chloride and potassium sulphate from California and Carlsbad, New Mexico, and bone char from Australia. These and other materials go to make up the numerous fertilizer mixtures needed by sugar and pineapple plantations with their varying soil conditions.

In a time when many fertilizer plants are beginning to feel the pinch of manpower shortages, PC&F is relatively free of immediate threat. Last year, Hawaii had a serious unemployment problem. By this year, the number of jobless had dwindled considerably. Latest official figures put the number at 11,140. That means there's still a sizable manpower reserve for PC&F and companies like it to draw on.

SOUTHERN CALIFORNIA CFA MEET

Southern California members of the California Fertilizer Association held a sectional meeting at Bakersfield April 24, with President Tatum in the chair. Secretary-Manager Bierly reported on 1952 convention plans, contacts with the U of California and activity keeping the membership posted on regulations and freight rates.

Dr. Macfarlane reported on the Soil Improvement Committee, the aim to establish a relationship with agricultural groups, and with the University, whose personnel is active in CFA conventions. He spoke of the fertilizer handbook, in preparation by Earle Shaw and his committee, and Mr. Shaw reported it in final draft form.

The motion picture script is in preparation under the direction of Haven Leavitt and his committee.

It was reported that the fertilizer essay contest is proceeding well and producing good results.

A new type fertilizer applicator has been donated by its manufacturer. American Potash and CFA paid the freight charges to bring it West for field tests.

Reports on the state of basic materials were followed by a general discussion on cotton fertilization, with Dr. Guy MacLeod as moderator. And R. L. Luckhardt reported on his research on plant uptake of fertilizer materials.

The group went to the Cotton Experiment Station to inspect onion and potato trials conducted by Dr. Oscar Lorens, and were invited to stay over the next day for the program sponsored by the Kern County AES.

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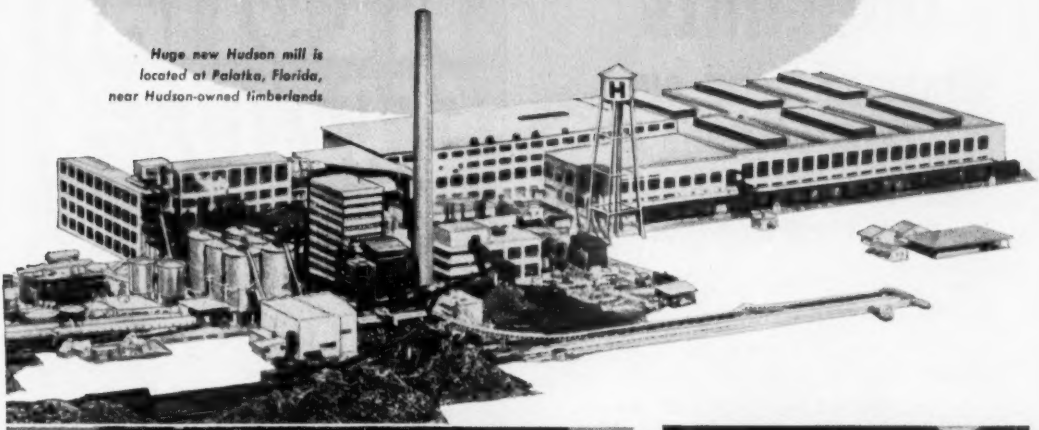

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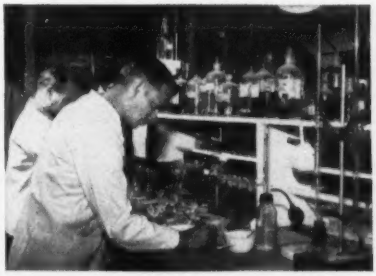

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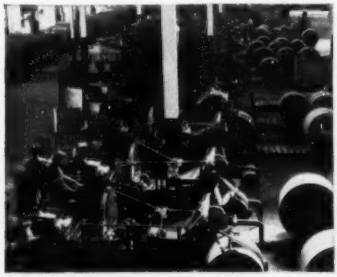

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Soil Sterilants

IN PRESENT DAY WEED CONTROL

By W. L. KLATT
Pacific Coast Borax Company
Given at the California State Weed Meeting—San Luis Obispo.

The invitation to appear on your annual state weed meeting program brought back many memories of some of the annual meetings and of the state weed programs of several of the Midwestern states in which I formerly had an active part. The weed work in California served as a guide in the development of weed work in some other states. I became State Weed Supervisor in Nebraska in 1937, at which time the Nebraska weed Program was initiated. I appreciated very much the assistance and counsel received from your Walter Ball at that time, which was of great help in formulating the Nebraska Weed Program.

We in Nebraska believed that we had difficult weed problems to solve, but after living in California and having had the opportunity to become better acquainted with weed problems and weed work in this state I soon learned that the variation in climatic conditions and soil types made weed work very complex. As a matter of interest, the weed work in Nebraska and some of the other midwestern states was primarily directed at the control and eradication of field bindweed (Convolvulus arvensis), which you probably better know as wild morning glory. Here in California we are much concerned with other noxious weeds. In the mid-western territory, it was quite possible to develop general recommendations regarding the use of herbicides which were quite applicable to the entire area. In California it appears as if it might be quite difficult to set up specific recommendations for a single county. Because of this situation my discussion on soil sterilants will have to be of a general nature.

I have found that the term soil sterilant, as applied to various herbicides, is often misleading. Commonly speaking, we think of soil sterilants as chemicals which render the soil unfit for plant growth. In practical use, the application of such chemicals does not always create a sterile soil, which sometimes causes considerable disappointment on the part of those not too well acquainted with the nature of weed work and the action of some chemicals classified as soil sterilants. Some plant species are tolerant to some of the chemicals recognized as soil sterilants; some soil types influence the degree of sterility, and the amount of the chemical applied may destroy unwanted plant species and not affect others. Probably a more specific definition for soil sterilants would be a group of chemicals which applied to the soil under given conditions may either destroy all vegetation or a selected plant species. Some of the soil sterilant chemicals may be used either as a temporary or a relatively permanent sterilant depending on the purpose for which the chemical is applied. For example, in some types of industrial weed control it is desired to achieve soil sterility as long as possible, whereas in agriculture it is generally desired only to control or to destroy a specific weed.

Greatest use of soil sterilants is made in industrial weed control for which purpose millions of pounds are used annually. Large quantities are also used for perennial weed control in agriculture. Market trends indicate that the demand for soil sterilants is steadily increasing.

The arsenicals and sodium chlorate are the oldest soil sterilants as far as general use is concerned. The arsenicals are both effective and long lasting under most conditions, if sufficient quantities are applied. Sodium arsenite has been the compound most extensively used, as this product is soluable and may be applied as a spray. White arsenic, which is insoluable and is applied in the dry form, is offering good possibilities and may receive more attention, if less hazardous application methods are developed. Arsenicals are very poisonous and extreme precautionary measures must be taken in the application and the handling of these products. There have been many cases of illness among those applying arsenicals and much livestock has been lost in past years as a result of the use of arsenicals in weed control. It is interesting to note that white arsenic is not so attractive to livestock as is sodium arsenite and may be less hazardous to use. Application rates of the arsenicals range from 300 to 1000 pounds per acre depending on soil types, the heavier the soils the higher the application rates must be. Since the arsenicals become fixed in the upper surface of the soil, their use has not been too effective on deep rooted perennials. The arsenicals, when applied in sufficient quantities, hold up longer as soil sterilants than most other chemicals being used today. Arsenicals have been used extensively by railroads for track spraying.

Sodium chlorate has received much attention and has been widely accepted as a herbicide. This product is used both as a contact spray and as a soil sterilant. It is being widely used for the destruction of deep rooted perennials such as wild morning glory and Canda thistle. In general, application rates of sodium chlorate range from 2 to 8 lbs. per. sq. rd. Recommended and accepted rates of application, on deep rooted perennials in the middle western states, are from 4 to 6 lbs.

per. sq. rd., whereas rates in the western group of states, under more arid conditions, appear to be from 6 to 8 lbs. per. sq. rd. In many localities the 8 lbs. rate appears to be the standard rate of application on deep rooted perennials. Soil type is an important factor with the use of sodium chlorate—soils high in organic matter or nitrate content require heavier rates of application than those of low organic content. Those of you who were in weed work when straw stacks were prevalent, will recall that it was almost useless to treat a noxious weed patch on an old straw stack bottom with sodium chlorate. You probably also recall that many farmers located their straw stacks on noxious weed patches, hoping that the stacks would smother and destroy the infestation.

In discussing rates of application with sodium chlorate, it was noted that roadside treatments of noxious weeds generally required heavier rates of application than agricultural lands under cultivation. It was also observed that best results with sodium chlorate were obtained when applied on firm and compact soils rather than on loose or recently plowed soils. As with the use of other chemicals, favorable moisture conditions are important in the use of sodium chlorate. Fall applications on perennials weeds usually gave better results than those made in late spring or summer. Sodium chlorate may be applied as a spray or in the dry form. There is apparently little difference in effectiveness on deep rooted perennials by either method, but, the fire hazards in the application are reduced considerably by applying in the dry form. Since sodium chlorate is fire hazardous, it must be used with discretion.

Carbon disulfide is a popular soil sterilant where very short periods of sterility are desired. It is mainly used on highly productive agricultural lands where the loss of a crop is an important factor. Although the use of carbon disulfide is costly, effects in the soil may not last over six weeks—at least not long enough to interfere with crop production if application is timed correctly. Best results appear to be obtained with carbon disulfide if it is applied during the warm seasons. Soil types and soil moisture are most important factors in the use of this chemical. Dry sandy soils often create difficult problems, in the use of carbon disulfide. This chemical is more effectively used on the deep rooted perennials than on the shallow rooted species.

Ammonium sulfamate is being used to some extent as a sterilant, and when used for this purpose application rates are usually from 400 to 600 lbs. per acre. Time of sterility appears to be from three to six months.

Trichloroacetic acid (TCA) is being used successfully in various parts of the country for the control of various grass species and if applied at sufficient rates will result in some soil sterilization. Favorable soil moisture appears to be an important factor in the successful use of TCA. Rates of application range from 50 to 200 lbs. per acre, although some reports were received that TCA was being applied at a rate of 435 lbs. per acre. Various combinations of TCA with other herbicides are being used, among which are TCA & 2,4-D and TCA & sodium chlorate. TCA as a soil sterilant is apparently short lived, usually from 60 to 90 days depending on soil moisture and soil texture.

A new product that is receiving considerable attention as soil sterilant is CMU (Para-chlorophenyl-L, 1-dimethylurea). This product has been rather extensively tested the past year and has received many favorable comments. Most satisfactory rates of application appeared to be in a range from 40 to 80 lbs. per acre when used as a soil sterilant. It is generally conceded that longer observations of the tests should be made before this product may be fully evaluated. Some of the questions yet to be answered are; length of time that sterility is obtained; the carry over effects on crop lands, and the effect of cumulative treatments.

In recent years the use of borate compounds as herbicides has developed extensively. Borate compounds contains boran, an essential element necessary for plant growth. Boron, when available to plants in excessive amounts, is toxic; thus, the use of borate compounds as herbicides. Boron compounds are toxic in proporation to the amount of boron they contain. Since the element boron does not occur free in nature but as boron trioxide (B_2O_3) in combination with the oxides of other elements, the relative strength of the borate compounds for herbicidal use may be denoted by the per cent of boron trioxide in their composition.

Refined borax, in a granulated form (Agricultural Mesh Borax), was one of the first borates to be used extensively as a herbicide. This product has a boron trioxide (B_2O_3) equivalent of 36.5%. The use of refined borax as a herbicide has been generally replaced by the product Borascu, which is a borate ore, the raw material from which refined borax is produced. Borascu contains 93% borax or 34% boron trioxide, and is processed to develop a coarse and granular material adapted for dry application as a herbicide. It should be noted that Borascu is a product distinct from refined borax.

A recent development for weed control use was the introduction of a Concentrated Borascu. This product, having the water of crystalization removed, has a boron trioxide equivalent of 61.5%. Roughly speaking, approximately only half as much Concentrated Borascu is required

as with the use of Borascu, thus in many areas Concentrated Borascu furnished more B_2O_3 per dollar of delivered material, through savings in transportation and handling cost.

The sodium borate ores, which are applied in a dry form, are widely used by railroads, utilities, petroleum installations and other industries for weed control purposes. They are also being extensively used for the eradication of certain types of noxious weeds in agriculture, among which are: St. Johnswort, leafy spurge, wild morning glory and Canada Thistle. The borate ores are relatively easy to apply, non-fire hazardous, non-poisonous to livestock and non-corrosive to ferrous metals.

Another development in the use of borate compounds as herbicides, is the use of mixtures or sodium pentaborate and sodium tetraborate, giving highly soluble borates suitable for spray application. One of the more recent of the polyborates is a highly soluble product with a boron trioxide equivalent of 66.6%. This product was not commercially available the past year, due to shortages of some chemicals required for manufacturing. Present indications are that this highly concentrated and highly soluble Polybor will be available this year. This product offers excellent possibilities for use on a number of deep rooted perennials at apparently lower amounts of boron trioxide than is required with the use of the Borascu's or refined borax.

The development of the soluble borates has also brought about the use of these compounds with mixtures of other herbicides, and primarily with sodium chlorate. The borate-chlorate mixtures have, to-date, received the most attention and are being marketed by several manufacturers under various formulations and trade names. The soluble borate-chlorate mixtures appear to combine the effectiveness and the outstanding characteristics of the borates and the chlorates in their use as herbicides. The fire hazards normally associated with the use of sodium chlorate are reduced or may be entirely eliminated depending on the formulation of the product. The soluble borate-chlorate mixtures are being used extensively in industrial weed control as well as for the destruction of perennial noxious weeds.

Borate compounds are generally applied as the basis of their boron trioxode content. Applications on deep rooted perennials are generally made at the rate of 8 to 10 lbs. of boron trioxide per sq. rd. This would be equivalent to 20 to 30 lbs. per sq. rd. of a material containing 34% boron trioxide such as Borascu or would be equivalent to 11 to 16 lbs. per sq. rd. of a material containing 61.5% boron trioxide such as Concentrated Borascu. Borate-chlorate combinations are generally applied at rates of 6 to 12 lbs. per sq. rd., depending on the formulation to be used and the plant species to be treated. Plant species, such as St. Johnswort, and tansy ragwort are destroyed with much lower rates—as low as ½ lb per sq. rd.

Considerable information has been gained in recent years relative to the more effective use of the borate compounds and the borate-chlorate combinations under a variety of conditions. Soil type, precipitation and time of application are among the important factors that influence the effective results. Fall applications or applications during the dormant season are more effective on the deep-rooted perennials. Where soil sterility and barren surfaces in industrial weed control are desired, the borate ores are most effective when applied before vegetation has emerged or when vegetation is still young and tender. The borate-chlorate combinations are more effectively used on Bermuda grass, quack grass and other grasses that tolerate relatively high boron concentrations.

No attempt has been made to cover all of the chemicals being used as soil sterilants in this discussion, but rather those that are in general use; nor was any attempt made to give specific rates and recommendations regarding the use of chemicals. Since there is such a varation of soil types and climatic conditions in California and even within counties, information regarding specific rates and time of application of chemicals should be obtained from state and county weed authorities and from experiment stations, which information should to a great extent be based on tests and experiments within a local area.

The increased interest in chemical industrial weed control has opened up a big field for the use of soil sterilants. Of the chemicals discussed, the borates and sodium chlorate, either alone or in mixtures, are seemingly being used more extensively for soil sterilization purposes. The borates and borate mixtures, because of their fire deterrent action, are widely used on highways, by industries and on other areas where fire or poison hazards are factors. These chemicals are also being used on irrigation ditches for weed control along the ditch banks and for soil treatment before ditches are lined, to prevent water loss. Likewise large quantities are used for soil treatment before asphalt surfaces are laid down in many areas, so as to prevent premature break-up of asphalting, caused by vegetative growth.

The present day uses of soil sterilants are indeed many and varied.

Whitson Union Special Representative

Union Special Machine Company, Chicago, Illinois, announces the appointment of R. W. Whitson as a representative to cover the Scranton, Wilkes Barre, Pennsylvania, and adjoining territories, replacing Steve Yambor, who left Union Special on March 15th.

MARKETS

March Tax Tag Sales Up

March, 1952, fertilizer tax tag sales and reports of shipments were the equivalent of 1,196,000 short tons of fertilizer compared with 1,094,000 tons during the same month a year ago—a slight increase of 100,000 tons, NFA reports.

April Tax Tag Sales Brighten

Fertilizer tax tag sales and reports of shipments from 10 reporting States during April, 1952, were the equivalent of 1,083,000 short tons of fertilizer—up 25 percent compared to equivalent sales of 863,000 tons during the corresponding month a year ago, according to a compilation of reports received by The National Fertilizer Association.

If the upswing is maintained, tax tag sales and reports of shipments for the 1951-52 fiscal year may be equal to or greater than the 11,321,000 tons sold in the preceding 12 months. At the present time, however, tag sales and reports of shipments during the 9-month period from July 1951 to March 1952 are about 100,000 tons less than the 8,153,000 tons sold in the first 9 months of the year ending June 30, 1951.

FERTILIZER TAX TAG SALES AND REPORTED SHIPMENTS
(In Thousands of Equivalent Short Tons)
Compiled by The National Fertilizer Association

STATE	March 1952	March 1951	February 1952	February 1951	Jan.-Feb. 1952	Jan.-Feb. 1951	Oct.-Nov.-Dec. 1951	Oct.-Nov.-Dec. 1950	July-February 1951-52	July-February 1950-51
Virginia	—	—	—	—	—	—	111	76	—	—
N. Carolina	—	—	308	277	540	615	223	286	856	1,006
S. Carolina	250	180	164	159	293	348	189	224	552	656
Georgia	220	284	106	183	188	439	200	212	440	718
Florida	119	94	136	126	298	279	398	367	848	807
Alabama	—	—	158	162	265	219	145	159	493	446
Tennessee	76	56	43	57	64	78	134	66	271	197
Arkansas	50	53	30	42	48	82	42	46	112	158
Louisiana	71	65	40	40	69	84	38	50	137	158
Texas	111	102	71	52	129	114	143	161	350	370
Oklahoma	—	—	24	15	35	28	26	22	99	84
TOTAL SOUTH	897	834	1,080	1,113	1,929	2,286	1,649	1,669	4,158	4,600
Indiana	106	71	91	77	246	204	287	281	729	700
Kentucky	80	77	84	61	166	155	124	130	368	363
Missouri	113	112	93	51	159	173	123	91	450	411
TOTAL MIDWEST	299	260	268	189	571	532	534	502	1,547	1,474
California	—	—	—	—	—	—	194	174	—	—
TOTAL OTHER	—	—	—	—	—	—	194	174	—	—
GRAND TOTAL	1,196	1,094	1,348	1,302	2,500	2,818	2,377	2,345	5,705	6,074

STATE	April 1952	April 1951	March 1952	March 1951	Jan-Mar 1952	Jan-Mar 1951	Jan-Feb-Mar 1952	Jan-Feb-Mar 1951	July-March 1951-52	July-March 1950-51
Virginia	—	—	—	—	—	—	322	312	525	470
N. Carolina	—	—	354	318	893	933	893	933	1,210	1,324
S. Carolina	148	111	250	180	543	528	543	528	802	836
Georgia	297	165	220	284	407	723	407	723	660	1,002
Florida	78	94	119	94	417	374	417	374	967	901
Alabama	—	—	250	167	516	386	516	386	743	613
Tennessee	99	92	76	56	140	134	140	134	347	254
Arkansas	75	99	50	53	99	136	99	136	162	211
Louisiana	54	47	71	65	140	149	140	149	208	223
Texas	63	59	111	102	239	215	239	215	441	472
Oklahoma	—	—	27	30	62	57	62	57	126	113
TOTAL SOUTH	814	667	1,528	1,349	3,456	3,635	3,778	3,947	6,211	6,419
Indiana	81	89	106	71	352	275	352	275	835	771
Kentucky	72	55	80	77	247	232	247	232	448	440
Missouri	116	52	113	112	272	285	272	285	563	523
TOTAL MIDWEST	269	196	299	260	871	792	871	792	1,846	1,734
California	—	—	—	—	—	—	1/	1/	—	—
TOTAL OTHER	—	—	—	—	—	—	—	—	—	—
GRAND TOTAL	1,083	863	1,827	1,609	4,327	4,427	4,649	4,739	8,057	8,153

1/ Not Available

ORGANICS: Interest in Organics for fertilizer use is primarily for future shipment. Some sales of Domestic Nitrogenous have been made for fall shipment at prices varying from $4.25 to $4.90 per unit of Ammonia, bulk, f.o.b. usual production points but no offerings are in the market at present. Imported Nitrogenous Tankage is offered in limited quantity for summer and fall shipment at around $6.00 per unit of Ammonia, bagged, CIF usual Atlantic ports.

CASTOR POMACE: Current production of Domestic Castor Pomace testing 6.75% Ammonia is quoted at $37.25 per ton, in burlap bags, or $2.00 per ton less if in paper bags, f.o.b. Northeastern production points. Very limited quantities are offered. Imported material varies in price from $42.00 to $46.00 per ton exvessel at ports.

DRIED BLOOD: Unground Dried Blood is indicated at $6.00 per unit of Ammonia, bulk, f.o.b. New York area and $6.00 to $6.25 in the Chicago area.

POTASH: Movement is steady and demand active for current supplies. Contract prices have not been announced by Domestic producers pending a decision from the OPS regarding an increase. Importers are also holding up price announcements awaiting news regarding domestic prices for the new season. Limited stocks for current use are available at several ports.

GROUND COTTON BUR ASH: This source of Potash, primarily in the form of carbonate of Potash, is available for prompt and future shipment. Material testing around 40% K20 delivers in most cases at approximately the same price as Sulphate of Potash.

PHOSPHATE ROCK: Demand continues steady and movement in good proportion. Prices remain unchanged.

SUPERPHOSPHATE: Tailored ceiling prices for producing points have been recently announced by the OPS. Prices now are as follows for typical production points for normal grade Superphosphate: Birmingham — 85¢; Jacksonville — 78¢; Atlanta—84¢; Savannah—80¢; Charleston—80¢; Wilmington—81¢; Cincinnati—98¢; Baltimore—86¢; Searsport, Me. — $1.03; Norfolk — 85¢; Memphis—95¢; Kansas City—$1.08, etc.

SULPHATE OF AMMONIA: Supply situation is definitely tight and prices steady at $40.00 to $45.00 per ton, bulk, f.o.b. Steel Mills.

AMMONIUM NITRATE: No change in prices has been announced from the current prices of $72.50 per ton, bagged, f.o.b. works for Canadian material and $63.00 to $64.00 per ton bagged, f.o.b. domestic works. Demand is in excess of supply.

NITRATE OF SODA: Arrivals of Imported material this month will ease the terrific shortage caused by recent strike in Chile.

IMPORTED CALCIUM AMMONIUM NITRATE: Several cargoes of this material testing 20.5% Nitrogen are arriving during middle May at Charleston, S. C., and Wilmington, N. C. Prices range from $60.00 to $61.00 per ton, f.o.b cars at the ports for material packed in multiwall paper or burlap bags.

GENERAL: Production of mixed fertilizers in the southeast is tapering off rapidly and some buyers are now contracting for supplies of raw materials such as Superphosphate and Organics for the new season. Contracts for Potash and Nitrogen for the new season will probably be proffered in the next few months.

Pacific Northwest Conference

The Soil Improvement Committee of the Pacific Northwest Plant Food Association has announced its third annual Regional Fertilizer Conference will be held at the Brannock Hotel, Pocatello, Idaho, July 9, 10 and 11. Scheduled to fit in with a Fourth-of -July vacation in Yellowstone and located in the heart of the great phosphorus deposits area of the U.S., the meetings should draw a large attendance from a radius of 1,000 miles. The Conference will provide an excellent opportunity for people of the fertilizer industry, the field men, technicians, County Agents, Extension and Experiment Station specialists to meet, to exchange ideas and to get the latest information from nationally recognized authorities on fertilizer, their manufacture and their use in the related problem of soil fertility in the Pacific Northwest.

Among the well-known scientists to speak at this conference are: Drs. John Painter of Oregon State and Todd Tremblay and Frank Viets of Washington on Foliar analysis; Drs. George Bateman and Jay Haddock of Utah, G. O. Baker of Idaho and Lewis B. Nelson of Colorado on fertilizers and soil fertility, and Dr Kenneth D. Jacob, Chief of Fertilizer and Agricultural Lime Division, B.P.I., Beltsville, Maryland, on phosphate fertilizers for western agriculture. A number of specialists with the fertilizer industry will discuss technical phases of fertilizer manufacture and processing.

The program briefly is as follows:

July 9—

A.M. Foliar and Soil Analysis.

P.M. Field Trip to Simplot Phosphate Mines and Introduction to the Geology of the Area.

July 10—

A.M. Soil Fertility Practices, Problems, and Relationships.

P.M. Field Trip to the Aberdeen Experiment Station, culminating in an evening banquet.

July 11—

A.M. Phosphate symposium.

P.M. Tour of Simplot and Westvaco Fertilizer Plants.

Hudson Sack Design Service

Julian Mendelsohn, Sales Manager of the multiwall sack department of the Hudson Pulp & Paper Corp. has announced the establishment of a free package design service to multiwall sack users.

The new department of packaging specialists will make a study of a customer's packages, sales problems and competition. On the basis of that study they will submit a design tailored to meet the user's specific needs. The design department has as its object a container which will serve as an effective sales promotion tool for the manufacturer.

SAFETY

(Continued from page 38)

that the fertilizer industry consider employing the best design practices for fire prevention in their construction or remodeling of plants. Adequate and the proper type hand fire extinguishment equipment is especially important for plants of combustible construction. Does your training program include teaching each employee how to use the fire suppression equipment? Adequate fire water systems for the expected exposure should be considered as important as the operating equipment of the plant. Until at least some of these are accomplished the present high compensation and fire insurance rates for the fertilizer industry will continue to be in force. It has been my experience that the greatest number of serious personal injuries are experienced during fires.

The importance of written operating instructions and job training programs have been demonstrated time and again in industry and these programs consistently result in safer and more economical work accomplishments.

The fertilizer industry, which in our opinion includes the manufacture of insecticides, has now spread to all sections of the country making it imperative that The Fertilizer Section Safety and Fire Prevention Programs be applicable on a National basis. In our opinion before comprehensive reduction in compensation and fire insurance cost can be accomplished a general overall reduction in industrial injuries and fire losses must be evidenced and established over a considerable period of time.

Brannan Urges Efficient Fertilizer Use

In keeping with plans now under way to increase production of fertilizers over the next few years, Secretary of Agriculture Charles F. Brannan has called upon all USDA agency heads to develop a coordinated program for making efficient use of these increased fertilizer supplies in meeting the Nation's need for additional food, feed and fiber. By 1955, it is hoped that nitrogen production capacity will be 70 percent higher than in 1951, phosphate 55 percent higher, and potash 51 percent higher.

Fulton Develops Anti Rodent Bag

Fulton Bag & Cotton Mills, Atlanta, Georgia, have just announced the development of a new rodent repellent-treated bag which they have named "Ratscat." This new secret formula can be used on either cotton goods or burlap.

Experiments with these new bags began in 1948, in cooperation with a large Louisiana rice farmers association. During the first year they used a few bags, which seemed satisfactory. Subsequent seasons they increased the use of these rodent repellent-treated bags and were highly pleased with the amount of grain they saved.

Fulton officials are greatly pleased with the favorable comments they are receiving from satisfied users.

Orders for Ratscat bags can be placed at any Fulton plant, officials said.

Advisory System Improvements Proposed

Recommendations designed to strengthen the advisory system for agricultural research were adopted by the Agricultural Research Policy Committee (established under the Research and Marketing Act of 1946 to advise the Secretary of Agriculture on research and marketing work) at its quarterly meeting. Among these were the following:

1. That a national forestry research advisory committee be established on a temporary basis.

2. That a working group be set up to survey the present research on soils, water, and fertilizers, and report to the Policy Committee next winter with recommendations concerning this program.

3. That a similar working group be set up to consider present research on production economics.

4. That the Policy Committee begin immediately a study to determine just what kind and how large an agricultural research program is needed during the next several years to help farmers meet the constantly increasing production of food and feed that is required to provide for the growing population. It was pointed out that at the present growth rate, the population will be 25 percent larger in 1975.

CLASSIFIED ADVERTISING

For Sale, Exchange and Wanted Advertisements, same type now used, EIGHT CENTS a word for one insertion; TWELVE CENTS a word for two insertions; FIFTEEN CENTS a word for three insertions, and FOUR CENTS a word for each insertion more than three; ADVERTISEMENTS FOR THIS COLUMN MUST BE PAID IN ADVANCE.

HELP WANTED. PLANT SUPERINTENDENT. EXPERIENCED IN FORMULATION, DRY MIXING, PLANT OPERATION, MAINTENANCE, HANDLING MEN. STATE SALARY WANTED. BOX 10, c/o Commercial Fertilizer, 75 Third St., N. W. Atlanta, Ga.

WANTED: Position as superintendent. 36 years old. Married. 18 years experience in the supervision of fertilizer and Sulphuric Acid plants. Excellent record and references. Box 311, c/o Commercial Fertilizer, 75 Third St. N. W., Atlanta, Ga.

FOR SALE: Quarter ton unit, Atlanta Utility Works, fertilizer mixer complete with basing elevator; excellent condition. RUTLEDGE MANUFACTURING COMPANY, RUTLEDGE, GA.

FOR SALE: 2-5′ x 40′ Ruggles-Coles Direct Heat Rotary Dryers; also Class A-2, 4′ x 20′; Class XF-4, 54″ x 25′; 1-5′6 x 24′ welded shell. Send us your inquiries for Jaw, Gyratory and Roll Crushers, Ribbon and Drum Mixers, Pulverizers, Bucket Elevators, Hammer Mills, Vibrating Screens. Belt Conveyors. We buy your idle machinery. Our 35th year. CONSOLIDATED PRODUCTS COMPANY, INC., 14 PARK ROW, NEW YORK 38, N. Y.

THE DOWD PRESS, INC., CHARLOTTE, N. C.

Wasteland To Pasture

Under the heading, "Good News", a current magazine reports that 110,000 acres in a midwestern state, once a part of the nation's dust bowl, will feed one million pounds of beef this year.

This is the great value of grasslands farming. To help reclaim and make productive many other millions of acres is the goal of the Green Pastures program to which P. C. A. pledges full cooperation.

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